

PATENT ABSTRACTS OF JAPAN

(11)Publication number : **2003-102710**
 (43)Date of publication of application : **08.04.2003**

(51)Int.Cl. **A61B 5/15**
G01N 33/48

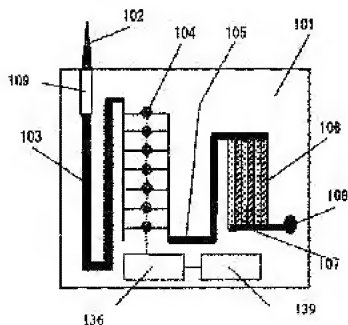
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(54) BLOOD ANALYSIS METHOD AND DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an easy-to-handle blood analysis system for collecting blood by use of a minute painless needle to reduce pain of the blood collection, capable of being used at home at ease due to the minuteness, and simplifying a part directly contacting with the blood disposable in light of safety so that anybody can use the system at a low cost.

SOLUTION: This blood analysis device is housed in a package (a housing device) without exposition of the needle allowing anybody to safely use the device at home, and is housed in a dedicated holder to collect the blood. In the blood collection, when pressing the holder onto a human body, the holder is automatically fixed. Since an analysis result of the blood is automatically outputted by the holder, anybody can use the device at ease.



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Notes:

1. Untranslatable words are replaced with asterisks (***).
2. Texts in the figures are not translated and shown as it is.

Translated: 06:45:39 JST 03/05/2009

Dictionary: Last updated 02/13/2009 / Priority:

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[Claim(s)]

[Claim 1] An extraction means to extract blood from in the living body in the base of one or more resin, The tools of analysis which analyze one of means, and the substance in the blood concerned among separation means to separate serum from a filtration means to filter the blood concerned extracted at least and to obtain plasma, or the blood concerned, The extraction means concerned, the filtration means concerned, the separation means concerned, and a channel means to connect the tools of analysis concerned, The extraction means concerned, the filtration means concerned, the separation means concerned, the tools of analysis concerned, a channel means, and the transportation device to which the blood concerned which exists in the channel means concerned is moved, The output means for taking out the information from the tools of analysis concerned outside, and the extraction means concerned, the filtration means concerned, the separation means concerned, the tools of analysis concerned and the transportation device concerned, In blood analysis equipment equipped with the control means for controlling operation of at least one means of the output means concerned, and the maintenance means made of resin for holding the ingredient of the blood concerned in the substrate concerned The analysis method of the blood using the blood analysis equipment characterized by preparing a filtration means to filter a blood cell and to obtain plasma by preparing in a channel two or more pattern groups which prevent passage of particles as a means for filtering the extracted blood concerned and obtaining plasma, and carrying blood in a channel means, and the equipment concerned.

[Claim 2] As a means for filtering the extracted blood concerned in said blood analysis equipment according to claim 1, and obtaining plasma Prepare two or more filtration pattern groups which prevent only passage of the particles more than the size provided in a part of channel concerned, and the blood cell size which prevents passage by the filtration pattern group concerned is arranged so that it may decrease gradually along with a channel. The analysis method of the blood using the blood analysis equipment which established a filtration means to dissociate for every particle diameter of the defined range, and the equipment concerned.

[Claim 3] By preparing in a channel two or more filtration patterns which prevent passage of particles as a means for filtering the extracted blood concerned in said blood analysis equipment according to claim 1, and obtaining plasma, and carrying blood The analysis method of the blood using the blood analysis equipment characterized by preparing the filtration means into which the blood cell channel means which the blood cell concerned moves, and the plasma channel means which plasma moves are made to divide in the inside of a channel, and the equipment concerned.

[Claim 4] In said blood analysis equipment according to claim 1, it faces establishing the extracted blood

cell channel means concerned according to claim 3 and the plasma channel means concerned. The analysis method of the blood using the blood analysis equipment characterized by having used the filtration pattern group concerned for separation of the blood cell channel means concerned and the plasma channel means concerned, and preparing this these these channel in parallel in a channel, and the equipment concerned.

[Claim 5] In order to filter the extracted blood concerned in said blood analysis equipment according to claim 1 and to obtain plasma The analysis method of the blood using the blood analysis equipment characterized by repeating and installing the pattern group of the same filtration means concerned in multiplex, and moving plasma and a blood cell with a channel means different, respectively, and the equipment concerned.

[Claim 6] The analysis method of blood analysis equipment and blood separated for every particle diameter that the channel which arranges several filtration pattern groups concerned from which the particle diameter which prevents passage differs in said blood analysis equipment according to claim 4 was made crooked, was formed, blood was moved, and the blood cell in the blood concerned was able to be defined.

[Claim 7] It faces arranging two or more filtration pattern groups concerned which prevent passage of particle diameter which is different in the crooked channel concerned in said blood analysis equipment according to claim 6, and moving blood. The analysis method of the blood using the blood analysis equipment characterized by arranging the filtration pattern concerned into which the size of the blood cell which prevents passage was turned outside, and was gradually changed from the inner side of crookedness one by one, and the equipment concerned.

[Claim 8] The analysis method of blood analysis equipment and blood characterized by establishing a blood cell accumulation means to accumulate the blood which is divided into the blood cell for every desired size, and moves in said blood analysis equipment according to claim 1 for every size of a blood cell.

[Claim 9] The analysis method of blood analysis equipment and blood characterized by establishing in parallel the channel means which the blood after filtration used as a blood cell accumulation means and the channel of plasma concerned moves in said blood cell accumulation means according to claim 8.

[Claim 10] The analysis method of blood analysis equipment and blood characterized by establishing the accumulation means of a blood cell using the filtration pattern group concerned which prevents the passage more than the defined particle diameter in said blood analysis equipment according to claim 9.

[Claim 11] It faces establishing the blood cell accumulation means concerned using two or more filtration pattern groups concerned which prevent only passage of the particles more than the path provided in a part of channel in said Claim 8 and blood analysis equipment according to claim 9. The analysis method of blood analysis equipment and blood characterized by having arranged by turns the blood cell accumulation means concerned with which a blood cell is accumulated for every blood cell of a desired size, and plasma part style means concerned to move plasma.

[Claim 12] It faces establishing the blood cell accumulation means concerned in the blood analysis equipment of first half Claim 8. Change the filtration pattern group concerned and two or more blood cell accumulation means concerned are arranged so that the particle diameter defined one by one from the upper stream may be gradually decreased along the direction to which blood moves. The analysis method of blood analysis equipment and blood characterized by having arranged accumulation means concerned to separate a blood cell so that the particle diameter accumulated may become small gradually

toward the lower stream.

[Claim 13] The analysis method of blood analysis equipment and blood characterized by having arranged by turns the portion which carried out the film of a part of wall surface of the channel means concerned by the living body conformity film, and the portion which is not carried out in Claim 8 and blood analysis equipment according to claim 9.

[Claim 14] The analysis method of blood analysis equipment and blood characterized by having branched and preparing the channel to which the blood which separated the channel means of a blood cell and the desired blood cell is moved in Claim 8 and blood analysis equipment according to claim 9.

[Claim 15] In the blood analysis equipment of a description, the blood tools of analysis concerned are bypassed following filtration operation of a blood cell to said Claim 1 A-01. the transportation device concerned which has prepared the blood cell downstream, or the blood discharge means of transportation concerned -- or the blood analysis equipment characterized by establishing a channel means to connect with the means of said both directly and the blood analysis method.

[Claim 16] Or an extraction means to extract blood from in the living body in the base of two or more resin, The tools of analysis which analyze one of means, and the substance in the blood concerned among separation means to separate serum from a filtration means to filter the blood concerned extracted at least and to obtain plasma, or the blood concerned, The extraction means concerned, the filtration means concerned, the separation means concerned, The support board of the blood analysis equipment which is made to combine the maintenance means made of resin for holding the ingredient of the blood perception means established in order to perceive introduction of blood inside a channel means to connect the tools of analysis concerned, and the channel means concerned, and the blood concerned in the substrate concerned, and is used is protected. For the means of the blood analysis equipment concerned, or in addition, the extraction means concerned, the filtration means concerned, the separation means concerned, the tools of analysis concerned, a channel means, and the transportation device to which the blood liquid concerned which exists in the channel means concerned is moved, The output means for taking out the information from the tools of analysis concerned outside, and the extraction means concerned, the filtration means concerned, the separation means concerned, the tools of analysis concerned and the transportation device concerned, Protect the support board of the blood analysis equipment which added at least one means among the control means for controlling operation of at least one means of the output means concerned, and connection of a blood collecting means and a channel means is strengthened. The protective case which attached to the surface a waste fluid mouth means to expose a conveyance guide and a waste fluid means outside, or the protective case of the blood analysis equipment which established the waste fluid mouth closure means which prevents exposure of a waste fluid mouth for a waste fluid mouth means in addition to the function of the protective case concerned.

[Claim 17] The penetration hole means which stores the blood analysis equipment indicated to said Claim 16, and takes out the extraction means concerned outside when extracting blood is prepared in the analysis position concerned. and the blood analysis equipment storage machine which established and protected the closure means which prevents the open air inflow to a blood analysis equipment stowage for the penetration hole means -- or Prepare closure and a channel is saved so that the channel means concerned may not be exposed to the open air, when some of blood analysis equipment concerned is outside exposed. The analysis method of the blood using the blood analysis equipment storage machine which has established the analysis position which performs analysis operation of blood in a different position from the preservation position fixed before using it on the occasion of analysis of blood, and the

blood analysis equipment storage machine concerned.

[Claim 18] It faces storing in the blood analysis equipment storage machine which described above the blood analysis equipment indicated to said Claim 16. The analysis method of the blood using the blood analysis equipment storage machine which the position in which the extraction means concerned and the penetration hole means concerned are prepared stores in the preservation position concerned by making into a preservation position the position which does not overlap on the curve only by rotation operation on [of one] a straight line, and the blood analysis equipment storage machine concerned.

[Claim 19] The preservation position using the fixed barrier means which is a barrier means which cannot be moved is prepared when storing the blood analysis equipment indicated to said Claim 17. The analysis method of the blood using the blood analysis equipment storage machine which the extraction means concerned of blood analysis equipment stores in the preservation position concerned which is not exposed outside, and the blood analysis equipment storage machine concerned.

[Claim 20] Prevent move operation of blood analysis equipment to at least one direction when storing the blood analysis equipment indicated to said Claim 17. The preservation position concerned which established the movable barrier means which can be moved, prepared combining the movable barrier concerned and the fixed barrier means concerned which cannot be moved, or was prepared combining the two or more movable barrier means concerned, The analysis method of the blood using the blood analysis equipment storage machine and blood analysis equipment storage machine which are stored in the preservation position concerned which the extraction means concerned of blood analysis equipment does not expose outside using either among these.

[Claim 21] The analysis method of the blood using the blood analysis equipment storage machine which prepared puncturing which opens the penetration hole puncturing means concerned which takes out an extraction means for movable barrier means concerned to use in the blood analysis equipment storage machine indicated to said Claim 20, and the blood analysis equipment storage machine concerned

[Claim 22] The analysis method of the blood using the blood analysis equipment storage machine which established a conveyance way means to move the blood analysis equipment concerned to the analysis position concerned from the preservation position concerned, in the blood analysis equipment storage machine indicated to said Claim 17, and the blood analysis equipment storage machine concerned

[Claim 23] The analysis method of the blood using the blood analysis equipment storage machine which punctures or removes the closure means concerned prepared in the penetration hole means concerned on the occasion of the blood extraction by the blood analysis equipment indicated to said Claim 17, and can take out the extraction means concerned outside, and the blood analysis equipment storage machine concerned.

[Claim 24] The analysis method of the blood using the blood analysis equipment storage machine which prepared the conveyance means puncturing part which introduces from the outside the conveyance apparatus which conveys the blood analysis equipment concerned in the blood analysis equipment storage machine indicated to said Claim 17, and the blood analysis equipment storage machine concerned.

[Claim 25] It faces conveying the blood analysis equipment of the blood analysis equipment storage machine concerned indicated to said Claim 18 in the analysis position concerned. [the equipment / the blood analysis equipment concerned is operated in at least two or more different directions, and is performed, or] The analysis method of the blood using the blood analysis equipment storage machine and blood analysis equipment storage machine which consisted of conveyance conveyance means which

combined two or more different operation, or prepared the conveyance way which different operation of two or more of blood analysis equipment produces.

[Claim 26] In the blood analysis equipment storage machine indicated to said Claim 17, for the channel means of the blood analysis equipment concerned, from the outside to pressurization Or the analysis method of the blood using decompression, liquid supply, waste fluid, the extraction operation apparatus constituted combining this these these means or the blood analysis equipment storage machine which prepared the extraction operation means opening which inserts a terminal area with that of a blood collecting system, and the blood analysis equipment storage machine concerned.

[Claim 27] The analysis method of the blood using the blood analysis equipment storage machine which constituted and established the conveyance way means concerned combining the conveyance way of a conveyance way, a straight line, or a curve which the blood analysis equipment concerned rotates in the blood analysis equipment of the blood analysis equipment storage machine concerned indicated to said Claim 17, and the blood analysis equipment storage machine concerned.

[Claim 28] When the blood analysis equipment concerned is conveyed in an analysis position, on the occasion of the blood extraction by the blood analysis equipment indicated to said Claim 17 [the blood collecting means concerned] The analysis method of the blood using the blood analysis equipment storage machine which established again the barrier means [backward feed / means / the preservation position concerned] in the conveyance means, and the blood analysis equipment storage machine concerned.

[Claim 29] The analysis method of the blood using the blood analysis equipment storage machine which prepared the barrier means in the circumference of the penetration hole means concerned inside a blood analysis equipment storage machine in the blood analysis equipment storage machine indicated to said Claim 17, and the blood analysis equipment storage machine concerned.

[Claim 30] the blood analysis equipment using the protective case of the blood analysis equipment which formed the means of communication which transmits information in the connection means and the exterior for connecting with the output means concerned prepared in the blood analysis equipment indicated to said Claim 16 -- the analysis method of the blood to call.

[Claim 31] The output signal from the blood analysis equipment indicated to said Claim 16 or the extraction means concerned, the filtration means concerned, the separation means concerned, the tools of analysis concerned, and the transportation device concerned, The analysis method of the blood using the blood analysis equipment storage machine which formed the means of communication which tells a signal in the exterior of the connection means and blood analysis equipment storage machine which tell the signal which controls operation of at least one means of the output means concerned from the exterior to blood analysis equipment, and the blood analysis equipment storage machine concerned.

[Claim 32] The extraction means concerned prepared in the blood analysis equipment concerned in the blood analysis equipment storage machine indicated to said Claims 2-02, the filtration means concerned, the separation means concerned, the tools of analysis concerned, and the transportation device concerned, The analysis method of the blood using the blood analysis equipment storage machine and blood analysis equipment storage machine which established a control means to control operation of at least one means of the output means concerned, or the conveyance operation concerned of blood analysis equipment.

[Claim 33] The analysis method of the blood using the blood analysis equipment storage machine and blood analysis equipment storage machine to which the output part means prepared in the blood analysis

analysis equipment concerned and the connection means prepared in the blood analysis equipment storage machine concerned will be connected if the blood analysis equipment indicated to said Claim 30 is fixed to the analysis position concerned.

[Claim 34] a connection means by which the blood analysis equipment concerned transmits the acknowledge signal which is fixed to the analysis position concerned and to output to the inside of a blood analysis equipment storage machine in the blood analysis equipment storage machine indicated to said Claim 33 -- the analysis method of the blood using the formed blood analysis equipment storage machine and the blood analysis equipment storage machine concerned.

[Claim 35] In the blood analysis equipment storage machine indicated to said Claim 30 The analysis method of the blood using the blood analysis equipment storage machine which has formed the means of communication which transmits outside the signal which outputs the output signal of the blood perception means concerned prepared in the inside of the blood analysis equipment concerned through a connection means to connect with the output means concerned, and the blood analysis equipment storage machine concerned.

[Claim 36] [means / to transmit the output signal of the blood perception means concerned prepared in the inside of the blood analysis equipment concerned in the blood analysis equipment storage machine indicated to said Claim 30 / output / with the signal from a connection means connection means] The analysis method of the blood using the blood analysis equipment storage machine which established the control means which carries out partial control of blood collecting operation at least, and the blood analysis equipment storage machine concerned.

[Claim 37] In the blood analysis equipment storage machine indicated to said Claim 30 The analysis method of the blood using the blood analysis equipment storage machine which formed the connection means and means of communication which output outside the proofreading data from the tools of analysis concerned accumulated in the control means with an analytical-data accumulation function prepared in the inside of the blood analysis equipment concerned, and the blood analysis equipment storage machine concerned.

[Claim 38] The analysis method of the blood using the blood analysis equipment storage machine which established the control means which does not start blood collecting operation until the output of the proofreading data of the tools of analysis concerned prepared in the inside of the blood analysis equipment concerned is completed in the blood analysis equipment storage machine indicated to said Claim 30, and the blood analysis equipment storage machine concerned.

[Claim 39] A data accumulation means to accumulate the proofreading data and blood analytical data of tools of analysis based on the tools of analysis concerned prepared in the inside of the blood analysis equipment concerned in the blood analysis equipment storage machine indicated to said Claim 30, and the control means of analytical-data accumulation, Or the analysis method of the blood using the blood analysis equipment storage machine which established one means at least, and the blood analysis equipment storage machine concerned.

[Claim 40] The analysis method of the blood using the blood analysis equipment storage machine which established a recovery means to have changed into the state where the invading part of the extraction means prepared in the blood analysis equipment concerned is not exposed in the blood analysis equipment storage machine indicated to said Claim 30, and to collect blood collecting means, and the blood analysis equipment storage machine concerned.

[Claim 41] The analysis method of the blood using the blood analysis equipment storage machine which

established a recovery means to destroy and store the form or the function of the blood collecting means prepared in the blood analysis equipment concerned in the blood analysis equipment storage machine indicated to said Claim 30, and the blood analysis equipment storage machine concerned.

[Claim 42] [the blood analysis equipment indicated to said Claim 16] in the blood analysis equipment storage machine indicated to said Claim 31 The analysis method of the blood using the blood analysis equipment storage machine which formed the preservation position connection means and means of communication for outputting the signal which shows that it is in the preservation position concerned of the blood analysis equipment storage machine concerned, and the blood analysis equipment storage machine concerned.

[Claim 43] In starting analysis of blood using the blood analysis equipment storage machine indicated to said Claim 42 The analysis method of the blood using the blood analysis equipment storage machine which established a control means to start operation conveyed in the blood collecting position concerned after detecting the signal which shows that the position of the blood analysis equipment concerned is one of the preservation positions of the blood analysis equipment storage machine concerned, and the blood analysis equipment storage machine concerned.

[Claim 44] In the blood analysis equipment storage machine indicated to said Claim 20, blood analysis equipment is faced starting conveyance operation in the analysis position concerned. It is the analysis method of the blood using the blood analysis equipment storage machine which established a means by which blood analysis equipment was not conveyed in an analysis position when there was no barrier means concerned in the position used as the barrier of the penetration hole means concerned which takes out an extraction means, and the blood analysis equipment storage machine concerned.

[Claim 45] An extraction means to extract blood from in the living body in the base of one or more resin, The tools of analysis which analyze the substance in a filtration means to filter the blood concerned extracted at least and to obtain plasma, and the blood concerned, The blood analysis equipment which is made to combine the blood extraction perception means established in order to perceive introduction of blood inside a channel means to connect the extraction means concerned, the filtration means concerned, the separation means concerned, and the tools of analysis concerned, and the channel means concerned, and is used is stored. For the means of the blood analysis equipment concerned, or in addition, the extraction means concerned, the filtration means concerned, the tools of analysis concerned, a channel means, and the transportation device to which the blood liquid concerned which exists in the channel means concerned is moved, The output means and the extraction means concerned for taking out the information from the tools of analysis concerned outside, Blood analysis equipment equipped with the control means for controlling operation of at least one means of the filtration means concerned, the separation means concerned, the tools of analysis concerned, the transportation device concerned, the blood perception means concerned, and the output means concerned and the maintenance means made of resin for holding the ingredient of the blood concerned in the substrate concerned is stored. Or the analysis method of the blood using the blood analysis equipment holder which prepared the function to store either of said blood analysis equipment in the blood analysis equipment storage machine indicated to Claim 16, and to perform extraction operation and extraction motion control of blood, and the blood analysis equipment holder concerned.

[Claim 46] an extraction means to extract blood from in the living body in the base of one or more resin -- and In order to perceive introduction of blood inside the output means for taking out the information from a channel means to connect the tools of analysis which analyze the substance in a filtration means

to filter the extracted blood concerned and to obtain plasma, and blood, and this these these means, and the tools of analysis concerned, outside, and the channel means concerned Attach the protective case concerned indicated at said Claim 16 to the blood analysis equipment which consisted of established blood perception means, and it stores in a blood analysis equipment storage machine. A control means to control at least one of the blood analysis equipment exchange function to exchange the blood extraction function to extract blood in order to conduct blood analysis, the analysis function to conduct analysis of blood, the analytical-data processing capability that processes blood analytical data, and blood analysis equipment, and these the these functions of these is established. The analysis method of the blood using the blood analysis equipment holder which prepared the function to move immediately the plasma or serum which carried out blood cell filtration of the blood to tools of analysis as it is, and to analyze blood immediately, and the blood analysis equipment holder concerned.

[Claim 47] The conveyance way and the conveyance means of conveying the blood analysis equipment concerned concerned or the blood analysis equipment storage machine concerned in the analysis position which performs analysis operation of blood in the blood analysis equipment holder indicated to said Claim 45, Or the analysis method of the blood using the blood analysis equipment holder which prepared any one function of the conveyance way concerned or the conveyance means concerned, and the blood analysis equipment holder concerned.

[Claim 48] Assemble the blood analysis equipment with which the unit which has the extraction function concerned, and the blood collecting means are not attached in the blood analysis equipment holder indicated to said Claim 46 in an analysis position, carry out it, and it joins together. Or the analysis method of the blood using the blood analysis equipment holder which prepared the function to assemble, carry out and join together, to convey in an analysis position, and to conduct blood analysis, and the blood analysis equipment holder concerned.

[Claim 49] In the blood analysis equipment holder indicated to said Claim 45 or Claim 46 It equips with the storage cassette which stored two or more pieces concerned of the blood analysis equipment, or the blood analysis equipment storage machine concerned. The analysis method of the blood using the blood analysis equipment holder which prepared the function to perform operation which exchanges the blood analysis equipment concerned or the blood analysis equipment storage machine concerned one by one, and loads with it on the occasion of analysis of blood, and the blood analysis equipment holder concerned.

[Claim 50] In the blood analysis equipment holder indicated to said Claim 45 or Claim 46 Form the proofreading liquid charging line required for proofreading, proofreading liquid supply pump, and supply control device of the blood tools of analysis concerned, and build in a proofreading liquid supply tank further, or it connects with an external proofreading liquid supply tank. The proofreading liquid charging line concerned is connected to the waste fluid means concerned of the blood analysis equipment concerned. Proofreading liquid is supplied to the inside of channel means concerned to combine between the tools of analysis concerned, the blood cell accumulation means concerned, the blood cell filtration means concerned, the extraction means concerned, and this these these means. The analysis method of the blood using the blood analysis equipment holder which prepared the function to extract the proofreading data of tools of analysis before conducting blood analysis, and the blood analysis equipment holder concerned.

[Claim 51] A conveyance means to convey the blood analysis equipment concerned stored by the preservation position concerned of the blood analysis equipment storage machine indicated to said

Claim 16 in the extraction position concerned is established. It is the analysis method of the blood using the blood analysis equipment holder which prepared the function which inserts the conveyance means concerned in the opening concerned of the blood analysis equipment storage machine concerned, is made to move the blood analysis equipment concerned to the blood analysis position concerned on the occasion of analysis of blood, and is fixed during analysis operation of blood, and the blood analysis holder concerned.

[Claim 52] Analysis of blood is faced in the blood analysis equipment storage machine indicated to said Claim 16. It is the analysis method of the blood using the blood analysis equipment holder which prepared the function which conveys the blood analysis equipment concerned in the analysis position concerned, and is fixed during analysis operation after moving and removing the conveyance way means concerned and the barrier means concerned established between the storage positions concerned, and the blood analysis equipment holder concerned.

[Claim 53] In the blood analysis equipment holder indicated to said Claim 45 and Claim 46 When blood analysis equipment is fixed to the analysis position concerned, the input-and-output means concerned prepared in the blood analysis equipment holder The output means concerned of blood analysis equipment, Or it is the analysis method of the blood using the blood analysis equipment holder which prepares in the position automatically connected with the means of communication concerned of a blood analysis equipment storage machine, and has prepared the function which transmits the signal currently fixed one by one while fixing to the analysis position concerned, and the blood analysis equipment holder concerned.

[Claim 54] In the blood analysis equipment holder indicated to said Claim 45 and Claim 46 On the occasion of the end of analysis operation of blood, the blood analysis equipment conveyance means holding part which engages with a blood analysis storage machine conveyance means in the outer wall of the blood analysis equipment concerned and the blood analysis equipment storage machine concerned, and is connected to it is prepared. The analysis method of the blood using the blood analysis equipment holder which prepared the function which moves the blood analysis equipment concerned or the blood analysis equipment storage machine concerned to a discharge position by the blood analysis storage machine conveyance means concerned, and the blood analysis equipment holder concerned.

[Claim 55] It faces performing extraction operation of the blood analysis equipment holder **** blood indicated to said Claim 45 and Claim 46. A human body is invaded, after fixing the extraction means concerned, the blood analysis equipment concerned, and the blood analysis equipment storage machine concerned to the blood analysis position in a blood analysis equipment holder and also fixing a blood analysis equipment holder to the invading position concerned. The analysis method of the blood using the blood analysis equipment holder which prepared the function to maintain a fixed state until blood extraction operation is completed, and the blood analysis equipment holder concerned.

[Claim 56] In the blood analysis equipment holder indicated to said Claim 45 and Claim 46 When the blood collecting means concerned is fixed to the invading position concerned, it closes and fixes in the blood collecting part of a human body. The analysis method of the blood using the blood analysis equipment holder which established the blood collecting cup means which makes atmosphere of the extraction means concerned negative pressure, and prepared the function to perform control of extraction operation and extraction operation in atmosphere pressure lower than atmospheric pressure, and the blood analysis equipment holder concerned.

[Claim 57] The analysis method of the blood using the blood analysis equipment holder which transmits

the data of pressure to a control means to prepare a pressure sensing means to perform pressure sensing in the inside of the blood collecting cup means concerned prepared in the blood analysis equipment holder indicated to said Claim 56, and to perform extraction motion control, one by one, and the blood analysis equipment holder concerned.

[Claim 58] The analysis method of the blood using the blood analysis equipment holder which established the mechanism which faces fixing the blood collecting means concerned to an invading position, and makes the invading depth of the extraction means concerned variable in the blood analysis equipment holder indicated to said Claim 45 and Claim 46, and the blood analysis equipment holder concerned.

[Claim 59] In the blood analysis using the blood analysis equipment holder indicated to said Claim 56 The analysis method of the blood using the blood analysis equipment holder which established the control means of the blood collecting which built in the clock which starts extraction of blood after the signal which shows the defined decompression state was transmitted to the control means concerned, and the blood analysis equipment holder concerned.

[Claim 60] In the blood analysis using the blood analysis equipment holder indicated to said Claim 56 The analysis method of the blood using the blood analysis equipment holder which established the control means of blood collecting operation which built in the clock which starts extraction operation of blood after checking the signal of the end of an output of the proofreading data from the tools of analysis concerned, and the blood analysis equipment holder concerned.

[Claim 61] In the blood analysis using the blood analysis equipment holder indicated to said Claim 56 [with the output signal from the blood perception means concerned prepared in the inside of the blood analysis equipment concerned currently fixed to the blood collecting position of the blood analysis holder concerned] The analysis method of the blood using the blood analysis equipment holder which established the control means which carries out sequential control of the quantity of the blood introduced into the inside of the blood analysis equipment concerned, and the blood analysis equipment holder concerned.

[Claim 62] In the blood analysis using the blood analysis equipment holder indicated to said Claim 56 The signal of the completion of blood extraction is transmitted from the blood perception means concerned prepared in the inside of the blood analysis equipment concerned currently fixed to the blood collecting position of the blood analysis holder concerned. The analysis method of the blood using the blood analysis equipment holder which established a control means to have returned the pressure of a blood collecting cup means to atmospheric pressure, and to complete blood collecting operation, and the blood analysis equipment holder concerned.

[Claim 63] The extraction means concerned prepared in the blood analysis equipment concerned in the blood analysis equipment holder indicated to said Claim 56, the filtration means concerned, the separation means concerned, the tools of analysis concerned, and the transportation device concerned, In order to transmit the control means or blood analytical data which controls operation of at least one means of the output means concerned, Or the analysis method of the blood using the blood analysis equipment holder which established the control means for performing motion control required for the conveyance motion control of blood analysis equipment or a blood part equipment storage machine, and the blood analysis equipment holder concerned.

[Claim 64] The analysis method of the blood using the blood analysis equipment holder which established the output means concerned prepared in the blood analysis equipment indicated to said

Claim 16, or an input-and-output means to have connected with the means of communication concerned formed in the blood analysis equipment storage machine indicated to Claim 30, and to transmit a signal, and the blood analysis equipment holder concerned.

[Claim 65] The extraction means concerned prepared in the blood analysis equipment concerned in the blood analysis equipment holder indicated to said Claim 45, the filtration means concerned, the separation means concerned, the tools of analysis concerned, and the transportation device concerned, The analysis method of the blood using the blood analysis equipment holder which established the control means in order to perform motion control required in order to transmit the control means or blood analytical data which controls operation of at least one means of the output means concerned, and the blood analysis equipment holder concerned.

[Claim 66] The analysis method of the blood using the blood analysis equipment holder which established the input-and-output means which will be connected with the output means concerned or the connection means concerned if the blood analysis equipment indicated to said Claim 16 or the blood analysis equipment storage machine indicated to said Claim 17 is fixed to a blood collecting position, and the blood analysis equipment holder concerned.

[Claim 67] If the blood analysis equipment indicated to said Claim 16 or the blood analysis equipment storage machine indicated to Claim 30 is fixed to the blood collecting position concerned The analysis method of the blood using the blood analysis equipment holder which established an input-and-output means to have outputted the acknowledge signal fixed to the position where the blood analysis equipment concerned collects blood, and to transmit the position of the blood analysis equipment concerned, and the blood analysis equipment holder concerned.

[Claim 68] It is outputted from the blood analysis equipment indicated to said Claim 16, or are transmitted from the blood analysis equipment storage machine indicated to said Claim 17. The analysis method of the blood using the blood analysis equipment holder which established a data accumulation means to store some of proofreading data of the tools of analysis concerned inside the blood analysis equipment concerned, analytical data, or data that are sent from these tools of analysis, and the blood analysis equipment holder concerned.

[Claim 69] It is outputted from the blood analysis equipment indicated to said Claim 16, or are transmitted from the blood analysis equipment storage machine indicated to said Claim 17. The analysis method of the blood using a means to receive a transmitting means to transmit the proofreading data of the tools of analysis concerned inside the blood analysis equipment concerned outside, and the blood analysis control data from the outside or the blood analysis equipment holder which established the control means of one of means at least, and the blood analysis equipment holder concerned.

[Claim 70] It is outputted from the blood analysis equipment indicated to said Claim 16, or are transmitted from the blood analysis equipment storage machine indicated to said Claim 17. The analysis method of the blood using the blood analysis equipment holder which established a means to control the extraction of an input-and-output means and blood which transmits the output signal of the blood perception means concerned prepared in the inside of the blood analysis equipment concerned, and the blood analysis equipment holder concerned.

[Claim 71] It is outputted from the blood analysis equipment indicated to said Claim 16, or are transmitted from the blood analysis equipment storage machine indicated to said Claim 17. The analysis method of the blood using the blood analysis equipment holder which established the control means which does not start blood collecting operation until it outputs outside the proofreading data of the tools

of analysis concerned prepared in the inside of the blood analysis equipment concerned, and the blood analysis equipment holder concerned.

[Claim 72] In the blood analysis equipment indicated to said Claim 16, or the blood analysis equipment storage machine indicated to said Claim 17 The analysis method of the blood using the blood analysis equipment holder which cannot equip the new blood analysis equipment concerned or the blood analysis equipment storage machine concerned unless the extraction means concerned prepared in the blood analysis equipment concerned are collected inside the recovery means concerned, and the blood analysis equipment holder concerned.

[Claim 73] It is outputted from the blood analysis equipment indicated to said Claim 16, or are transmitted from the blood analysis equipment storage machine indicated to said Claim 17. The analysis method of the blood using the blood analysis equipment holder which established an input-and-output means to transmit the output signal which shows that the position of the blood analysis equipment concerned is one of the preservation positions concerned of the blood analysis equipment storage machine concerned, and the blood analysis equipment holder concerned.

[Claim 74] In starting analysis of blood in the blood analysis equipment holder indicated to Claim 42 The analysis method of the blood using the blood analysis equipment holder which established a control means to start operation conveyed in a blood collecting position after detecting the signal which shows that the position of the blood analysis equipment concerned is one of the preservation positions of the blood analysis equipment storage machine concerned, and the blood analysis equipment holder concerned.

[Claim 75] In the blood analysis equipment storage machine indicated to said Claim 3, the barrier means concerned faces the start of operation which takes out the extraction means concerned outside. It is the analysis method of the blood using the blood analysis equipment holder which established the control means which does not take out an extraction means when there is nothing in the position used as a barrier, and the blood analysis equipment holder concerned.

[Claim 76] Until the pressure of the blood collecting cup means concerned accompanying the completion of extraction acquires the signal which returned to atmospheric pressure in the blood analysis using the blood analysis equipment holder indicated to said Claim 56 The analysis method of the blood using the blood analysis equipment holder which established the control means which does not carry out the analytical-data output from the tools of analysis concerned, and the blood analysis equipment holder concerned.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] The analysis equipment and the production method of the blood using the chip equipment currently called the micro capillary constituted by the micro slot channel which produced this invention to insulation material boards, such as a quartz board and a polymer board, It is a field about the composition and the controlling method of a package and a special-purpose machine machine which are needed when using the blood analysis equipment concerned.

[0002]

[Description of the Prior Art] [the blood extracted by the extraction means 102 of blood established on

the support board 101] as conventional blood analysis equipment is shown in drawing 1 After a conventional filtration means 109 to filter plasma separates in advance of analysis of blood, it introduces and accumulates into a separation means 103 by which the curvilinear form part of the U character pipe is prepared, and 2nd separation of serum and a blood cell is performed inside a separation means with a centrifuge separation method. The method of choosing either and separating only by one side is sufficient as this these these filtration means and a separation means. Analysis of blood is faced following the end of separation operation. By driving the pump which is the transportation device 106 which carries out blood movement It analyzes by introducing the serum accumulated into the separation means in the tools of analysis 104 by discharging the buffer solution accumulated into the pump which are the channel means 105 and the transportation device 106, and the channel means 107 from the discharge means 108 to the chip exterior. It obtains and excels by this analysis, and blood analytical data are outputted outside and end blood analysis.

[0003] Therefore, the method of the composition of blood analysis equipment constituting a control means 139 to control a series of operation of this these these means, and an output means 136 to output an analysis result outside, on one or two or more support bases in addition to this these the aforementioned this means, and analyzing blood was needed.

[0004] Moreover, the blood which the blood analysis equipment concerned extracted is set for a filtration means to perform separation of a blood cell and plasma. In order to filter gradually from a large blood cell to a small blood cell like the old work example shown in drawing 2 according to the size of a blood cell Along the inflow direction 124 of the channel 110 of blood, establish the first filtration means 111, and accumulate a blood cell 112 in the first blood cell accumulation means 118, and it is removed. Next, the method of removing by establishing the second filtration means 113, accumulating a blood cell 114 in the second blood cell accumulation means 119, removing it, establishing the third filtration means 115 finally, and accumulating a blood cell 116 in the third blood cell accumulation means 120, and completing filtration operation was used. The number of stages of these filtration means can be changed according to the filtration characteristic for which it asks.

[0005] Moreover, when using the blood analysis equipment concerned, the method of doing the opening work of closure of the blood analysis equipment by manual operation and the storage work by manual operation after use at the time of use was taken.

[0006] Furthermore, when using the blood analysis equipment concerned, the method of performing output control by manual operation was used also in control of the invading depth of the extraction means concerned, or blood collecting time, and the output of blood analytical data in blood collecting operation.

[0007]

[Problem to be solved by the invention] However, the thing which complication and large-scale-izing of the system of analysis equipment produce by the method of constituting all the means required by an output from extraction in one or two or more support bases, joining together as one disposable system, and using blood analysis equipment, Since a control means by which blood is not contacted directly, an output means, etc. become indispensable [throwing away simultaneously], the composition of a system becomes expensive. Therefore, it is necessary to constitute the portion which becomes useless to the minimum.

[0008] In the composition of such blood analysis equipment, in the conventional filtration means, a blood cell is accumulated in the blood cell accumulation means concerned, and we are anxious about the

change problem of the constituent-of-blood ratio which the blood cell destruction by the increase in blood collecting time by piping resistance increase of a channel, or pump load increase and the increase in pressure inside a blood cell accumulation means causes. Therefore, in order to solve these problems, the blood analysis equipment using the blood cell filtration means which was simplified and was constituted from a means by which a centrifuge separation method is not necessarily used and which and was simplified needs both composition methods. [blood analysis] Moreover, when using blood analysis equipment, the storage work by manual operation after opening of closure by manual operation or use is eliminated, from opening to storage is performed automatically, and a still safer preservation means is required.

[0009] Furthermore, the control means for performing a series of blood analysis operation to blood collecting operation which performs a blood collecting means safely, accumulation of analytical data, and storage of the blood analysis equipment after transmission and the end of blood analysis when using actual blood analysis equipment is required.

[0010]

[Means for solving problem] This invention offers inexpensive and safe blood analysis equipment, having the same function and performance by constituting each as individual equipment or apparatus and joining together combining these on the occasion of blood analysis, in order to solve these technical problems. Two or more means to contact directly the blood extracted from a human body are constituted from simplification of blood analysis equipment as one piece of equipment, and it is considered as throwing away, and by constituting two or more means by which it does not contact blood and directly, as another equipment, and using them by one side, repeatedly, it is inexpensive and simplification and a safe equipment configuration are offered. The outline of the blood analysis equipment which simplified the blood cell filtering method to drawing 6 is shown. With the blood analysis equipment concerned, the blood attracted by the suction pump 106 is introduced into the inside of blood analysis equipment through the extraction means 102, and the extracted blood passes the filtration means 129 and the blood cell accumulation means 130, and has composition of a simple means to carry out movement to the tools of analysis 104 of plasma immediately.

[0011] Moreover, when using blood analysis equipment, the storage work by manual operation after opening of closure by manual operation or use is eliminated. The blood analysis equipment storage machine which has secured the safe preservation means is formed, a control means of operation, and the connection means and means of communication of analytical data required for an output are formed in this, and further used blood collecting means are collected safely.

[0012] Furthermore, when using actual blood analysis equipment, the blood analysis equipment holder which controls even storage of the blood analysis equipment after blood collecting operation, accumulation and transmission of analytical data, and the end of blood analysis, and performs it is prepared, and the apparatus which carries out motion control of these continuously, and conducts blood analysis is offered.

[0013]

[Mode for carrying out the invention] The outline of the composition of the filtration means based on this invention used for the blood analysis equipment concerned shown in the first work-example drawing 6 was shown in drawing 3. The same number describes the thing same all over a figure as drawing 6 and drawing 2. By the pattern group of the 1st blood cell filtration means 111 prepared in the inside of a channel 110, the blood 124 introduced from the extraction means introduces the 1st blood

cell 112 to the 1st blood cell channel means 121. Then, the blood containing the 2nd blood cell 114 and 3rd blood cell 116 which passed the 1st blood cell filtration means introduces the 2nd blood cell to the 2nd blood cell channel means 122 by the pattern group of the 2nd blood cell filtration means 113. furthermore -- then, the blood which consisted of the 3rd blood cell and plasma -- the -- the 3rd blood cell is introduced to that of the 3rd blood cell channel means 123 by the blood cell filtration means 115 of eye three, and the remaining blood separated with the filtration means is moved by a channel 117. [0014] Blood cell ***** which prevents passage is gradually made small from the large size in an order from the upper stream of a channel, and the pattern group prepared into the channel forms the channel of blood in the above mentioned appearance, and makes it move to it combining the pattern group to which separate into for every size of a blood cell, and it is made to move. Moreover, although the stage of the filtration means showed what was constituted from a three-stage in the work example, it is possible to make into further two or more stages the particles in the blood which should be filtered, and to have composition.

[0015] The composition outline of the 2nd work example of the filtration means based on the second work-example this invention is shown in [drawing 4](#) . The same number describes the thing same all over a figure as [drawing 1](#) , [drawing 2](#) , and [drawing 3](#) . In this work example, in order to separate the blood cell more than a desired size collectively and to divide the blood cell of the size more than a request, and the blood cell below a request into a different channel, the desired minimum size has used for the filtration means the pattern group used for the filtration means 115 as the 3rd blood cell used for said first work example, for example.

[0016] As for the blood 124 introduced from the extraction means, the pattern group of a blood cell filtration means 115 of a channel 110 to filter the blood cells from the 1st to the 3rd collectively in part is prepared. The blood which passes a channel bundles up a big blood cell, is separated from the size defined by this pattern group, the blood cell channel means 125 is moved, and the blood containing the blood cell of a size smaller than the 3rd blood cell moves the blood channel means 117 after blood cell filtration. Moreover, as shown in this figure, it is possible for there to be no necessity that the channel of a blood cell and plasma is single, to separate a channel after filtration, and to move blood to tools of analysis efficiently.

[0017] Moreover, it faces arranging these filtration means inside a channel, the pattern group of the same filtration means is made multiplex in two or more steps, and it prepares in piles in a channel, it arranges so that two or more filtration can be performed, and the performance of filtration is raised.

[0018] The composition outline of the 3rd work example of the filtration means based on the third work-example this invention is shown in [drawing 5](#) . The same number describes the thing same all over a figure as [drawing 6](#) , [drawing 2](#) , [drawing 3](#) , and [drawing 4](#) . As for the blood which flowed into the filtration means from the direction shown by 124, although separation is recommended for every size of the 1st, the 2nd, and the 3rd blood cell, a small blood cell tends to be mixed in the channel of a big blood cell by the field of the straight line filtration means 126 of the first phase. In order to recommend the separation for every desired size further, after, constituting the channel which separated the field of the crookedness channel means 127 only with the 3rd blood cell filtration means for example, and moving, By preparing the channel by the filtration pattern group of an each the size of the blood cell concerned in the field of the crookedness filtration means 128, the blood cell of a small size is returned and moved to the separated original channel by centrifugal separation operation.

[0019] When the arrangement of the filtration pattern group in a main stream way prepared the filtration

pattern group which becomes small gradually toward an outside from the inner side of crookedness of the size of the particles which prevent passage and a blood cell moves toward the outside of crookedness by centrifugal separation operation In order that blood cells smaller than the size defined by the filtration pattern group may gather in the crookedness exterior, the separation for every blood cell size is promoted.

[0020] The composition outline of the 1st work example of the blood cell accumulation means based on the fourth work-example this invention is shown in [drawing 7](#) . The same number describes the thing same all over a figure as [drawing 6](#) , [drawing 2](#) , [drawing 3](#) , [drawing 4](#) , and [drawing 5](#) . By a blood cell filtration pattern group, the 1st blood cell channel means, the 2nd blood cell channel means, The blood which is divided into the 3rd blood cell channel means 123 and the plasma channel means 117 of plasma, and moves is prepared in the 1st blood cell accumulation means 118, the 2nd blood cell accumulation means 119, and the 3rd blood cell accumulation means 120, and an accumulation means to separate and accumulate every 1st blood cell, 2nd blood cell, and 3rd blood cell is established. the size of the blood cell separated although this example has shown separation of the blood cell as a three-stage -- not a three-stage but further two or more stages -- or it cannot be set as still fewer stages also until it says

[0021] And a blood cell accumulation means and the blood channel means after blood cell filtration are arranged in parallel with the move direction of blood, and have the structure where the piping resistance by a blood cell being accumulated in a filtration means does not increase remarkably during operation of filtration.

[0022] With each blood cell accumulation means, the 1st blood cell accumulation means The pattern group of the 1st filtration means, The pattern group of the 2nd filtration means and the 3rd blood cell accumulation means are constituted using the pattern group of the 3rd filtration means, the 2nd blood cell accumulation means is established, and a blood cell accumulation means to accumulate a blood cell for every size of a blood cell is established.

[0023] Furthermore, it sets to arrangement of each blood cell accumulation means. Between the 1st blood cell accumulation means, between the 2nd blood cell accumulation means, between the 3rd blood cell accumulation means, The plasma part style means 133 used as the channel of plasma is established between the 1st and 2nd blood cell accumulation means and between the 2nd and the 3rd blood cell accumulation means concerned, and piping resistance by a blood cell being accumulated in the pattern group of a blood cell accumulation means is made into the structure which does not increase during operation of filtration. the size of the blood cell separated although this example has shown separation of the blood cell as a three-stage -- not a three-stage but further two or more stages -- or it cannot be set as still fewer stages also until it says

[0024] The arrangement style outline of the blood cell accumulation means based on the fifth work-example this invention is shown in [drawing 8](#) . The same number describes the thing same all over a figure as [drawing 6](#) , [drawing 2](#) and [drawing 3](#) , [drawing 4](#) , [drawing 5](#) , [drawing 6](#) , and [drawing 7](#) . In the arrangement which establishes a blood cell accumulation means using two or more filtration pattern groups The 1st accumulation means according from the upper stream to the 1st blood cell filtration means one by one along with a channel, Change a filtration pattern group that the size of the blood cell accumulated gradually seems to become small in order of the 2nd accumulation means by the 2nd blood cell filtration means, and the 3rd accumulation means by the 3rd blood cell filtration means, and two or more blood cell accumulation means are arranged. A blood cell accumulation means to separate and

accumulate for every blood cell size by arranging so that the particle diameter accumulated may become small gradually along with a channel has been arranged. Moreover, there is no necessity that the width of a channel including a blood cell accumulation means is constant, and reduction of the blood volume extracted because the increase in the piping resistance by accumulation of a blood cell sets it as the size which does not have influence in movement of blood, and collection time can be aimed at.

[0025] The outline of the filtration means based on the sixth work-example this invention is shown in [drawing 9](#) . The same number describes the thing same all over a figure figure as [drawing 6](#) , [drawing 2](#) , [drawing 3](#) , [drawing 4](#) , [drawing 5](#) , [drawing 7](#) , and [drawing 8](#) . The living body conformity film formation part 134 which it faced establishing a blood cell accumulation means using two or more filtration pattern groups, and was covered with the living body conformity film, The channel which arranged alternately the living body conformity film agensis part 135 which has not been covered with a living body conformity film, or the channel which has not been covered with a living body conformity film is prepared, and the structure which the blood cell ingredient which remains in the blood after blood cell separation accumulation is made to stick to the living body conformity film surface, and raises separation of a blood cell is established. the size of the blood cell separated although this example has shown separation of the blood cell as a three-stage -- not a three-stage but further two or more stages -- or it cannot be set as still fewer stages also until it says Moreover, it cannot be overemphasized that it is also possible to prepare without combining with a filtration means to filter a blood cell.

[0026] The composition outline of the channel means based on this invention is shown in [drawing 4](#) . The same number describes the thing same all over a figure as [drawing 6](#) , [drawing 2](#) , and [drawing 3](#) . from the channel which has established the blood cell accumulation means, the plasma which moved from a filtration means means 115 to filter plasma from blood branches, is moved, mixing of a blood cell is minimized by introducing into the means prepared in the next, and blood analysis operation is made in the inside of a short time -- channel composition has been carried out.

[0027] The composition outline of the channel means based on this invention is shown in [drawing 10](#) . The blood containing many blood cells separated from blood branches for the blood cell accumulation means 130. move to a blood cell accumulation means, the blood which filtered the blood cell of the desired size should move to tools of analysis, and a blood cell should pass the channel means 137 directly from a blood cell accumulation means -- a transportation device -- or pass the channel means 138 -- [it is preparing the channel which moves to a waste fluid means, and] Or the channel which reduces the increase in the piping resistance by accumulation of a blood cell consists of establishing these channel means both.

[0028] A general view of the blood analysis equipment about the apparatus used in order to use for the safe method of preservation and directions for use for eliminating the opening work of closure by manual operation and the storage work after use, and performing them, the recovery method, and it when using the blood analysis equipment by the eighth work-example this invention is shown in drawing 13 from [drawing 11](#) . In the example of the blood analysis equipment 202 shown in [drawing 10](#) , a cover which is not exposed is covered using the protective case 201 which gave the function required for operation of safe preservation and blood analysis except the required portion. A protective case strengthens connection maintenance with an extraction means 203 by which the blood collecting channel 204 is formed in the blood collecting piping 205 in the air, and the channel inside a support board, forms the waste fluid mouth 210 which a waste fluid means exposes outside, and constitutes it.

Furthermore, a waste fluid mouth means 210 to connect and expose the channel of a waste fluid means outside is established, and the waste fluid mouth closure means 211 of the waste fluid means is formed in the waste fluid mouth means exposed further. In the exterior surface form of the protective case, the conveyance guide 1206, the conveyance guide 1207, and the conveyance guide 1208 are formed in the direction parallel to the conveyance guide 1209 which is the slot prepared in the direction perpendicular to blood collecting piping, and blood collecting piping. However, it is not necessary to be blood analysis equipment which not necessarily contained the transportation device and the control means in the actually used blood analysis equipment.

[0029] Drawing 14 shows the outline of the blood analysis equipment storage machine which stores the blood analysis equipment which carried out the exterior of the protective case by this invention. The penetration hole means 214 which faces the exterior part 213 using blood analysis equipment, and takes out a required extraction means, and a closure means 220 to close puncturing which these openings were made to penetrate inside a storage machine, and was prepared are established. Blood analysis equipment maintains and saves a pure atmosphere so that the direct open air may not be contacted, and it has formed the analysis position 236 for making it operate in a preservation position and a different position shown in drawing 17 on the occasion of analysis of blood. What is necessary is just to prepare these openings if needed with an actual blood analysis equipment storage machine. Moreover, what is necessary is to close and just to use in this example, also by the storage method which the part of the blood analysis equipment exposes outside as structure **** which stores the whole blood analysis equipment showed drawing 19 when using, so that the channel of blood analysis equipment may not be exposed to the open air.

[0030] It faces storing blood analysis equipment in the blood analysis equipment storage machine in drawing 14, and saving. the structure saved in the preservation position 235 which will turn into a position where the extraction means concerned and the penetration hole means concerned do not become an one straight line top if blood analysis equipment is stored in the preservation position 235 -- or Like the 2nd example of the blood analysis equipment storage machine shown in drawing 31, even if blood analysis equipment rotates in a preservation position, by making into a preservation position the position which is not exposed, it fixes to the preservation position concerned and an extraction means is stored only in rotation operation.

[0031] The outline of the blood analysis equipment storage machine 1 is shown in drawing 14 as the 1st example of a blood analysis equipment storage machine. It faces storing blood analysis equipment in this blood analysis equipment storage machine 1, and saving. Blood analysis equipment is fixed to the preservation position by establishing the barrier of the structure which prepares more highly than the position of blood analysis equipment the position of the fixed barrier means 216 which is the barrier which cannot be moved towards two directions, and the conveyance way 215, and is pressed down with the blood analysis equipment control spring 224, and combining these. The outline of the blood analysis equipment storage machine 3 is shown in drawing 30 as the 3rd example of a blood analysis equipment storage machine. It faces storing blood analysis equipment in this blood analysis equipment storage machine 3, and saving. The fixed barrier means 222 which blood analysis equipment cannot rotate is established, the structure pressed down with a blood analysis equipment control spring is established, blood analysis equipment is fixed to a preservation position, blood analysis equipment is fixed in the state where a blood collecting means is not exposed, and it is made to have saved.

[0032] The outline of the blood analysis equipment storage machine 2 is shown in [drawing 23](#) as the 2nd example of a blood analysis equipment storage machine. It fixes in the state where it faces storing blood analysis equipment in this blood analysis equipment storage machine 2, and saving, the movable barrier means 230 which can be moved towards one direction is established, and a blood collecting means does not expose blood analysis equipment, and is made to have saved. It cannot be overemphasized that it can combine with the fixed barrier described above in installation of the obstacle which fixes the blood analysis equipment which it had among these, and two or more barriers can be established.

[0033] Furthermore, as shown in the above mentioned movable barrier 230 at drawing 21, the penetration means 2231 which is puncturing for opening the penetration hole means 214 wide and taking out an extraction means outside by facing, and being moved and fixed for performing blood analysis operation is established. Moreover, when it is desirable to make it the structure which cannot return to the fixed place of a basis as for the movable fastener means which moved, it has engaged with the form of 215 for the conveyance way means as shown in drawing 21.

[0034] The move operation outline of the blood analysis equipment storage machine 1 and the blood analysis equipment storage machine 2 is shown in [drawing 17](#), [drawing 18](#) and [drawing 24](#), and [drawing 25](#). When using blood analysis equipment, it is combined with the conveyance guide 1 and the conveyance guide 3 which were prepared in the protective case exterior of the decision system analysis equipment which the blood analysis equipment fixed to the preservation position moved, and was described above, and the conveyance way means 215 to which it is made to move to the analysis position 236 is established.

[0035] When starting move operation to an analysis position via the conveyance way where the above mentioned blood analysis equipment moves, in the work example shown in [drawing 17](#) and [drawing 18](#), it opens or removes a closure means 220 by which the penetration hole means 214 is closed is started.

[0036] Via the conveyance way where blood analysis equipment moves, [move operation to an analysis position] If external force is applied in the direction which opens or removes closure of the conveyance means puncturing part 217 prepared in the blood analysis equipment storage machine in the work example shown in [drawing 17](#) and [drawing 18](#), introduces conveyance **** apparatus, and intersects perpendicularly with direction of blood collecting piping of an extraction means The control spring 224 changes, blood analysis equipment is lifted, a fixed barrier means is removed, and it stops at the place where the conveyance way means 215 and the conveyance means 208 of blood analysis equipment are blown, and an extraction means and the penetration hole means 214 are located on one straight line. Moreover, in the work example shown in [drawing 24](#) and [drawing 25](#), closure of a barrier means conveyance arm opening is opened or removed. A movable barrier means is moved, a movable barrier is moved to the position which can take out a blood collecting means from a penetration hole means, a penetration hole puncturing means, and a penetration hole means, and it conveys by introducing conveyance apparatus into the conveyance means opening 218. In the work example of [drawing 23](#), immediately after removing a closure means, it conveys by introducing conveyance apparatus from a conveyance means opening.

[0037] In the work example shown in [drawing 17](#) and [drawing 18](#), it faces conveying blood analysis equipment in an analysis position. If external force is applied from the extraction operation means opening 1218 and the extraction operation means opening 2219, again, the control spring 224 will

change, blood analysis equipment will be lifted, the conveyance means 2 will be overcome, and it will go to the blood analysis equipment inspection position 236. Since the inclination used as the section which cannot perform move operation is prepared, and it is made higher than the bottom of blood analysis equipment and has prepared only in the one direction as the conveyance means 2 showed to drawing 21 in this blood analysis equipment inspection position, blood analysis equipment is fixed to a blood analysis equipment inspection position where a blood collecting means is taken out. In order to carry out move operation of such blood analysis equipment to a blood analysis equipment storage machine, the conveyance way means constituted combining at least two or more different conveyance directions is established.

[0038] The extraction operation means opening 2219 which inserts the apparatus made to move blood analysis equipment to an analysis position in the work example shown in drawing 17 and drawing 18 is formed in the position in which connection with the waste fluid means of blood analysis equipment is possible. Connection with the system which operates blood analysis equipment by inserting the extraction operation apparatus constituted from the exterior combining pressurization, decompression, liquid supply, waste fluid, or this these these means in blood collecting operation, and connecting is enabled.

[0039] A general view of the blood analysis equipment applied to a conveyance way means to perform rotation operation to drawing 30 is shown. It cuts to the protective case of the chip made into the blood analysis equipment rotation center 237, and lacks, and a part is prepared in the side and the conveyance guide 1 and the fixed obstacle means 2209 are formed in the bottom. It cuts, and it lacks and a part takes the blood analysis equipment rotation lead 237 in the case of move operation. When this blood analysis equipment is stored in a blood analysis equipment storage machine in a preservation position, after the fixed obstacle means with the same cross-sectional form has geared with the aforementioned conveyance means 2, it is fixed with a control spring. If external force is applied on the occasion of analysis of blood from the extraction operation means opening 1 and the extraction operation means opening 2 The control spring 224 changes, blood analysis equipment is lifted, and the conveyance means 2222 is overcome, and it rotates and stops until it contacts the conveyance way means 1 by using as a fulcrum the blood analysis equipment rotation support position 243 established in the inside of a blood analysis equipment storage machine. Furthermore, if external force is applied, move operation will be performed according to the conveyance way means 1, and it will go to the blood analysis equipment inspection position 236. Since the inclination used as the section which cannot perform move operation is prepared, and it is made higher than the bottom of blood analysis equipment and has prepared only in the one direction as the conveyance means 2 showed to drawing 26 in this blood analysis equipment inspection position, blood analysis equipment is fixed to a blood analysis equipment inspection position where a blood collecting means is taken out. Thus, it constituted combining the conveyance way of the conveyance way and straight line which rotate the blood analysis equipment concerned, or a curve for the conveyance way means.

[0040] The conveyance means prepared in the blood analysis equipment storage machine consists of form used as the barrier means [backward feed / again / a blood collecting means / means / a preservation position], if blood analysis equipment is conveyed in an analysis position. Although this work example showed the example of single taper form, it cannot be overemphasized that it is also possible to arrange continuously using two or more taper form and exaggerated bang form.

[0041] It is necessary to make it exposure of an extraction means not arise in blood analysis in

preservation of blood analysis equipment other than the time of use. For this reason, [an extraction means exposes the preservation position of blood analysis equipment, and] further as shown in the blood analysis equipment storage machine of [drawing 32](#) although there is nothing When an extraction means is taken out at the same time it forms the barrier means 2223 in the circumference of a penetration hole means and raises safety further, the role of the sleeve supporting an extraction means is given.

[0042] In the composition general-view figure of the blood analysis equipment based on this invention of the ninth work-example [drawing 11](#) , [the protective case 201] Transmission of the signal from an output means 136 to transmit the signal which has detected the introductory situation of the blood from the blood extraction perception means 141 prepared in the entrance and exit of each means to constitute analytical data and blood analysis equipment from the tools of analysis prepared in the inside of blood analysis equipment as the outline was shown in [drawing 10](#) , In order to receive a control signal required for operation of blood collecting etc., the connection means 244 is established.

[0043] As an outline is shown in blood analysis equipment at [drawing 10](#) , the output signal from blood analysis equipment, such as transmission to the exterior of blood analytical data, and an output signal from a blood perception means, And the extraction means prepared in blood analysis equipment, a filtration means, a separation means, tools of analysis, a transportation device, and the blood extraction perception means 141 shown in [drawing 10](#) , In order to transmit the input signal to blood analysis equipment, such as a control signal for performing control of operation of at least one means of the output means 136, or transmitting control of blood analytical data, to the exterior of blood analysis equipment, and mutual The control signal for forming the connection means 216 and a means of communication 226 in a blood analysis equipment storage machine, and performing operation required for blood collecting is transmitted.

[0044] In order that [moreover,] the blood analysis equipment shown in [drawing 11](#) may be stored in the blood analysis equipment storage machine shown in [drawing 14](#) and may control blood collecting operation The extraction means, the filtration means, the separation means, the tools of analysis, and the transportation device which have been prepared in blood analysis equipment using the signal from the terminal area means prepared in blood analysis equipment, A control means 245 with a data accumulation function to control operation of at least one means among a blood extraction perception means, output operation of an output means, and conveyance operation of blood analysis equipment is formed in a blood analysis equipment storage machine, and blood collecting motion control is performed.

[0045] The connection means prepared in the blood analysis equipment storage machine shown in the output part means prepared in the blood analysis equipment shown in [drawing 11](#) and [drawing 14](#) is prepared in the position where connection is made mutually, if fixed to the analysis position 236 which is a position where blood analysis equipment collects blood.

[0046] The acknowledge signal which was fixed to the position where [drawing 11](#) blood analysis equipment collects blood, and was fixed to the analysis position when the output means and the connection means were connected is transmitted to the control means of a blood analysis equipment storage machine through an output part means and a connection means. Or a signal is transmitted outside through the output part means and connection means which are connected, and a means of communication, and blood collecting operation is controlled.

[0047] Then, a connection means to transmit the blood extraction signal from each blood extraction

perception means prepared in the channel inside the blood analysis equipment shown in drawing 10 if extraction operation of blood is started to the control means of a blood analysis equipment storage machine through an output part means, Or the means of communication transmitted outside from a means of communication through an output part means and a connection means is formed.

[0048] At least some signals are received among the signals from the blood perception means concerned prepared in the channel inside blood analysis equipment required in order to control this blood analysis operation. A signal is transmitted to the control means 245 of blood collecting operation, and a control means to control a part of blood collecting operation at least is prepared in the inside of the protective case of a blood analysis equipment storage machine.

[0049] The blood introduced into blood analysis equipment passes the blood cell separation means concerned, the blood cell separation means concerned, or one one of means, and is introduced into tools of analysis by blood collecting operation of the blood analysis equipment shown in drawing 1 , and analysis of blood is started. after extraction of the analytical data based on tools of analysis is completed, analytical data lead the connection means prepared in the inside of the blood analysis equipment concerned shown in drawing 12 -- the inside of a blood analysis equipment storage machine -- or it is outputted to the exterior of a blood analysis equipment storage machine through a connection means and a means of communication.

[0050] In order to conduct blood analysis in desired accuracy continuously, the proofreading data of tools of analysis is needed before blood analysis. Moreover, after introducing blood into tools of analysis, it becomes difficult for discharge of blood to also normalize the inside of blood analysis equipment completely. Therefore, in order to check that collection of proofreading data has been ensured and to introduce blood, analysis of blood establishes the control means which does not start the next blood collecting operation, and has prepared the control facility that imperfect analytical data are not extracted until the output of proofreading data is completed.

[0051] [the proofreading data and blood analytical data from the tools of analysis concerned prepared in the inside of blood analysis equipment] It is controlled by the control means prepared in the inside of a blood analysis equipment storage machine, and if the data accumulation means of a blood analysis equipment storage machine is accumulated temporarily, it is further outputted to the blood analysis equipment storage machine exterior through a connection means and a means of communication and the output of data is completed by it, an acknowledge signal will be transmitted and it will end.

[0052] After analysis of blood is completed, although blood analysis equipment is thrown away only by use once, it is collected so that the extraction means which contacted the blood of the human body after use may not remain outside exposed. As the outline of the work example of collecting blood collecting means to drawing 40 was shown, a recovery means to store the portion which contacted the blood of the extraction means near the extraction means of a blood analysis equipment storage machine is established, and extraction means are collected. In this extraction means, the form of the extraction means after recovery or performance is not necessarily asked.

[0053] When blood analysis operation of blood analysis equipment is completed in the extraction hand attached to blood analysis equipment in recovery of this extraction means The portion 374 in contact with the blood of the extraction means is bent, an invading function and an extraction function are destroyed, an extraction means recovery means 349 to collect by the inside of a blood analysis equipment storage machine carrying out a storage means is established, and it stores and collects inside.

[0054] It faces newly analyzing blood using blood analysis equipment. Since the signal which shows

that it is normal intact blood analysis equipment is outputted As an actual example is shown in drawing 12, it has prepared in the position which can connect with the output means of the blood analysis equipment in a preservation position the preservation position connection means 221 for outputting the signal which shows that blood analysis equipment is in the preservation position of a blood analysis equipment storage machine to the inside of a blood analysis equipment storage machine.

[0055] It must face newly analyzing blood using blood analysis equipment, must check that it is normal intact blood analysis equipment, and blood collecting must be started. In analysis of the blood using a showing-in drawing 12 work example, the control system which does not perform conveyance operation to an analysis position is prepared until a control system receives and checks the signal which shows that blood analysis equipment is in the preservation position where a blood analysis equipment storage machine is normal.

[0056] Moreover, it faces newly analyzing blood using blood analysis equipment. It faces starting operation which is used for the blood analysis equipment storage machine which showed the example in Fig. 113 and from which a movable barrier means takes out an extraction means outside, and when there is nothing in the position used as the barrier of the penetration hole means which takes out an extraction means, a control means by which extraction operation of an extraction means is not performed is established.

[0057] The composition outline of the example of a blood analysis equipment holder based on this invention is shown in the tenth work-example drawing 34. The outline of the composition means of the blood analysis equipment which can be used for this blood analysis at drawing 33 is shown. This blood analysis equipment is simplified and constituted from a composition means of the work example shown in drawing 10. It constitutes from the channel means and the output means of joining an extraction means, a maintenance means, a filtration means, tools of analysis, a blood cell accumulation means, a waste fluid means, and these means, and a control means to control at least one item among these control is prepared in the blood analysis equipment holder in extraction operation of proofreading liquid or blood. [the blood analysis equipment holder by this invention] It cannot be overemphasized that the function to store the blood analysis equipment of the work example which showed the outline to the blood analysis equipment storage machine shown in drawing 14, drawing 19, drawing 23, or drawing 30 as a work example at drawing 10 or drawing 33, and to perform analysis motion control of blood is also prepared.

[0058] The composition outline of the example of a blood analysis equipment holder based on this invention is shown in drawing 34. [the blood analysis equipment holder shown in the composition general-view figure of this figure] [the blood analysis equipment storage machine shown in drawing 12, drawing 15, drawing 17, or drawing 23 as a work example] The protective case shown in the work example of drawing 12, drawing 21, or drawing 28 is attached and stored to the blood analysis equipment of a work example in which the outline was shown at drawing 33. The extraction function which consists of an extraction means 328 and an extraction atmosphere control means in order to analyze blood, And the blood analysis function to perform movement of blood and supply of proofreading liquid, and data input and output and the analytical-data processing capability which performs data accumulation, And the control facility which controls at least one of the blood analysis equipment exchange functions to convey and exchange a blood analysis equipment storage machine, and the functions of these is prepared, the plasma or serum which blood cell filtration ended is succeedingly

moved to tools of analysis in succession, and the function to perform blood analysis is prepared.
 [0059] Using this blood analysis equipment holder, [blood collecting] in the case of a start First, the conveyance way guide 339 and conveyance which were shown in a blood analysis equipment storage machine conveyance means 317 to convey in the analysis position 308 which takes out an extraction means from the position in which the blood analysis equipment or the blood analysis equipment storage machine shown in [drawing 36](#) was carried outside, and performs analysis operation of blood, and [drawing 35](#) are prepared.

[0060] [analysis of the blood using this blood analysis equipment holder] The composition of a means to conduct blood analysis is changed. [Fig. 308] as an example of operation it joins together in the extraction position which performs an assembly for the shown extraction means, the blood collecting cup 301 which performs extraction **** control, the atmosphere primary detecting element 306, the invading depth controller 303, the atmosphere shield 367, and the extraction means maintenance means 307 beforehand, attaches a blood collecting unit and a blood collecting means, and analyzes blood. After constructing, and performing length, or constructing unitedly and performing length, it has the function conveyed and used for the extraction position of blood.

[0061] In the blood analysis equipment holder of this example shown in [drawing 34](#) In order to carry out continuous [of the blood analysis] and to conduct it, two or more blood analysis storage machine cassettes 325 which have stored two or more blood analysis equipment storage machines 324 which stored the blood analysis equipment shown in [drawing 33](#) are stored. The function to equip with the storage cassette into which it sends one by one inside a blood analysis equipment holder with the charge spring 326 in support of a blood analysis equipment storage machine in a support plate 327 and the charge guide 323 and which is loaded with an intact blood analysis equipment storage machine is prepared.

[0062] [proofreading of the tools of analysis which face conducting blood analysis and are needed in advance] As shown in the work example of [drawing 34](#) , just before loading the inside of a main part with blood analysis equipment or a blood analysis equipment holder If the blood analysis equipment storage machine conveyance means 317 prepared in the inside of a blood analysis equipment holder is moved in the direction contrary to an analysis position and a proofreading liquid supply arm is pushed The proofreading liquid charging line 321 is connected to the waste fluid means of blood analysis equipment through the proofreading liquid supply arm wheel pin 320. The drive of the proofreading liquid supply pump 329 is controlled by control from the control means 310 with a data accumulation function which built in proofreading liquid supply control. The function to perform supply operation which introduces the proofreading liquid stored by proofreading liquid supply tank 322 inside into the inside of a channel means to combine between tools of analysis, a blood cell accumulation means, a blood cell filtration means, an extraction means, and these means is prepared.

[0063] It faces fixing blood analysis equipment to the position which extracts blood. The blood analysis storage machine conveyance means 317 is driven for the blood analysis equipment or the blood analysis equipment storage machine which was shown in [drawing 34](#) and which an inside is filled up with proofreading liquid and stored by the blood analysis storage machine cassette 325 like a work example in the 1st operation, blood analysis equipment is turned to an analysis position, and conveyance operation is started. [the 2nd operation] like the work example shown in [drawing 36](#) if blood analysis equipment or a blood analysis equipment storage machine approaches the blood analysis position of

blood A blood analysis equipment storage machine pushes the point of contact 336 of the blood analysis equipment conveyance arm 337. Make a blood analysis equipment rotation arm rotate by setting the axis of rotation as the blood analysis equipment conveyance arm axis of rotation 338, and the blood analysis equipment conveyance pin 1342 is inserted in the blood analysis equipment conveyance pin insertion hole 1345. Blood analysis equipment 341 is moved in the analysis position move direction 1346, and it fixes on the conveyance means 334 parallel to piping of a blood collecting means. The blood analysis storage machine conveyance arm 314 is made to drive in the 3rd continuing operation. The blood analysis equipment conveyance pin 2314 and the blood analysis equipment conveyance pin 3352 are inserted in the blood analysis equipment conveyance pin insertion hole 2351 of a blood analysis equipment storage machine, and the blood analysis equipment conveyance pin insertion hole 3354. Blood analysis equipment 308 is conveyed in the analysis position move direction 2347, and the extraction means 328 is taken out from the penetration hole means 314. Blood analysis equipment has prepared the function fixed in a blood analysis equipment storage machine by the blood analysis equipment conveyance pin 1 blood analysis equipment conveyance pin 2, the blood analysis equipment conveyance pin 3, and the conveyance means 222.

[0064] moreover, perform extraction operation of a blood collecting means and pass said 1st operation carried out and the 3rd operation, after applying external force in a charge position using a pin from the exterior and performing move operation of a movable barrier, in using the blood analysis equipment storage machine shown in drawing 23 -- the function fixed to an analysis position is prepared.

furthermore, in using the blood analysis equipment storage machine shown in drawing 30, pass said 1st operation carried out and the 3rd operation -- the function fixed to an analysis position is prepared.

[0065] If conveyance is ended and it is fixed to a blood analysis position, the input-and-output means 350 prepared in the blood analysis equipment holder is formed in the position automatically connectable with the output means of blood analysis equipment, or the means of communication of a blood analysis equipment storage machine. The function which transmits the signal in the state where it is being fixed to the control means with a data accumulation function by the analysis position, one by one is prepared.

[0066] Like the work example shown in drawing 38 on the occasion of the end of extraction in a blood analysis equipment holder Engage the blood analysis storage machine conveyance means 1314 to the blood analysis equipment storage machine conveyance arm holding part 227 prepared in the outer wall upper surface of blood analysis equipment or a blood analysis equipment storage machine, and combination with a conveyance means is performed to it. On the occasion of recovery of blood analysis equipment or a blood analysis equipment storage machine, the function which a charge position is made to convey the blood analysis equipment conveyance means 317, and discharges it is prepared.

[0067] [an example of the blood extraction using the eleventh work-example book blood analysis equipment holder] as the outline is shown in drawing 35 Face performing extraction operation of blood analysis equipment holder **** blood, take out an extraction means from a penetration hole means, and blood analysis equipment and the blood analysis equipment storage machine concerned are fixed to the blood analysis position 308 in a blood analysis equipment holder. When a blood analysis equipment holder also decompresses the blood collecting cup means 1301, after fixing to an invading position, a human body is invaded, and the function to maintain a fixed state is prepared until blood extraction operation is completed.

[0068] In operation of blood collecting, first, if a blood collecting means is fixed to the blood analysis position 308, the blood collecting means supporter 1304 and the penetration hole means 304 which take

out the extraction means by the side of the blood analysis equipment holder of the blood collecting cup means 1301 will be closed. Next, if a blood extraction holder is moved to the position which extracts blood, the blood collecting cup opening 1360 is contacted and the decompression pump 366 is operated, the atmosphere which lets the decompression pump piping 364 pass will be exhausted, the inside of a blood collecting cup will be in a decompression state, and a blood analysis equipment holder will be fixed to the position which invades. Furthermore, if a decompression pump is operated, the skin of a human body will be taken into the inside of a blood collecting cup, and the function in which invading is started for the atmosphere of an extraction means in a decompression atmosphere lower than atmospheric pressure is prepared.

[0069] When extracting blood, a pressure sensing means 305 to perform pressure sensing is formed in the inside of the blood collecting cup means of a blood analysis equipment holder, the decompression state inside a blood collecting cup is outputted, and the function which transmits the data of pressure to a control means to perform extraction motion control, one by one is prepared.

[0070] The invading depth in extraction of blood has formed the invading depth controller 303 which makes the invading depth of an extraction means variable between the blood collecting cup contact part 358 and the blood collecting cup deepest part 365, in order to optimize according to the subject who inspects blood, and to adjust the projection length of an extraction means. Moreover, the angle decided to be a human body by the blood collecting cup contact part 1360 and the blood collecting cup contact part 2360 which perform **** has established exchangeable structure so that it may carry out by changing a blood collecting cup.

[0071] In blood collecting operation of blood, the signal which shows the defined decompression state is transmitted to a control means from a pressure sensing means, and if decompressed by even the pressure which the inside of a blood collecting cup set up, the function in which extraction operation is started by the control means of extraction operation of the blood having the clock in a blood analysis equipment holder is prepared.

[0072] After receiving the signal which the output of the proofreading data from tools of analysis with the proofreading liquid introduced into the inside of blood analysis equipment before blood collecting operation ended on the occasion of the blood collecting operation start of blood, the control means which built in the clock which starts extraction of blood starts control of blood collecting operation. As long as there is no end signal of an output of proofreading data in a blood analysis equipment holder, the control means which does not start blood collecting operation is established.

[0073] the blood collecting motion control of blood -- the time -- setting -- a blood analysis holder -- [an output signal / the output signal from the blood perception means concerned prepared in the inside of the blood analysis equipment currently fixed to the blood collecting position is transmitted to a control means, and] through an input-and-output means Operation of the transportation device 316 which was shown in the work example of drawing 34 and which has been prepared in the inside of a blood analysis equipment holder is controlled, and the control means which carries out sequential control of the quantity of the blood introduced into the inside of blood analysis equipment is established.

[0074] When ending blood collecting operation, receive the completion signal of extraction from the inside of blood analysis equipment, and then operation of a transportation device is stopped. Next, if air opening of the inside of a blood collecting cup is carried out by suspending the decompression pump of a blood collecting cup, the skin of a human body is returning to the original state, ends invading, and has established a blood collecting control means to complete blood collecting operation.

[0075] The extraction means concerned prepared in the blood analysis equipment holder at blood analysis equipment, the filtration means concerned, the separation means concerned, the tools of analysis concerned, and the transportation device concerned, In order to perform motion control required in order to transmit a control means to control operation of at least one means of the output means concerned, or blood analytical data A control means, Or the function which each part carries out actuating signal detection of blood analysis equipment, the conveyance motion control of a blood part equipment storage machine, etc., and controls blood collecting operation synthetically is prepared.

[0076] In order to perform reception of the analytical data from extraction, the control signal required for analysis operation, and tools of analysis of blood etc. The output means prepared in blood analysis equipment or a blood analysis equipment storage machine or an input-and-output means 350 to connect with the means of communication formed in the blood analysis equipment storage machine is established in an analysis equipment holder, and it enables it to have transmitted the data of the signal mutually.

[0077] The blood extraction perception means 141 shown in the blood analysis equipment holder at an extraction means, a filtration means, a separation means, tools of analysis, a transportation device, and drawing 10 as an outline was shown in drawing 34 for the motion control of blood analysis, The control means for performing motion control required in order to transmit the control signal or blood analytical data which controls operation of at least one means of an output means is established.

[0078] [arrangement of the input-and-output means prepared in the blood analysis equipment holder] like the work example shown in drawing 36 If the blood analysis equipment or the blood analysis equipment storage machine used for blood analysis is fixed to a blood analysis position, it has prepared in the position linked to the output means of blood analysis equipment, or the means of communication of a blood analysis equipment storage machine.

[0079] If blood analysis equipment or the blood analysis equipment storage machine indicated to 2-01 is fixed to a blood analysis position in the work example shown in drawing 36 A control means to output the signal which blood analysis equipment outputs the signal fixed to the analysis position through an input-and-output means, and checks the position of blood analysis equipment is established.

[0080] In the work example of a blood analysis equipment holder which preceded starting analysis of blood and was shown in drawing 36 It is outputted from blood analysis equipment, or the control means with a data accumulation means which is transmitted from the blood analysis equipment storage machine concerned and which can store the proofreading data of the tools of analysis inside blood analysis equipment is established.

[0081] In the work example of a blood analysis equipment holder shown in drawing 36 It is outputted from blood analysis equipment, and is transmitted through the means of communication of a blood analysis equipment storage machine, and a transmitting means to transmit the analytical data based on the tools of analysis of blood analysis equipment outside, or a control means to transmit and store data in the control means with a data accumulation function in a blood analysis equipment holder is established.

[0082] It is outputted to the blood analysis equipment holder shown in drawing 36 from blood analysis equipment. An input-and-output means to transmit the output signal from a blood perception means which is transmitted through a blood analysis equipment storage machine and which tells the blood ***** situation inside blood analysis equipment is established, it receives, quantity of the blood extracted by establishing a control means required for the extraction motion control of blood is

extremely made into a very small quantity, and blood analysis is conducted.

[0083] In the composition general-view figure of the blood analysis equipment holder based on this invention of drawing 36, the control means which does not start blood collecting operation is established until outputting outside the data which proofreads the tools of analysis inside blood analysis equipment which are outputted from blood analysis equipment, and which are transmitted from a blood analysis equipment storage machine is completed.

[0084] In the composition general-view figure of the blood analysis equipment holder based on this invention of drawing 38 Analysis of blood is completed and blood analysis equipment or a blood analysis equipment storage machine is set in a recovery position or a blood analysis equipment storage machine. Even if the extraction means 328 prepared in blood analysis equipment is being fixed to the recovery position 375 If not collected inside the recovery means 349, with used blood analysis equipment or a blood analysis equipment storage machine, the extraction means will be exposed. Since it is larger than the size of the recovery hole 376 collected and taken out, it is made it is larger than blood analysis equipment or a blood analysis equipment storage machine in the size of a recovery hole, and smaller than the case where a blood collecting needle is taken out, and has prepared so that it cannot take out and collect.

[0085] In the composition general-view figure of the blood analysis equipment holder based on this invention of drawing 38 In advance of analysis of blood, it faces moving blood analysis equipment to a blood analysis position, and the input-and-output means and the control means of transmitting the output signal which shows that blood analysis equipment is in a proper preservation position inside a blood analysis equipment storage machine to a control means are established.

[0086] In the composition general-view figure of the blood analysis equipment holder based on this invention of drawing 38 In advance of analysis of blood, it faces moving blood analysis equipment to a blood analysis position, and after detecting the signal which shows that the position of blood analysis equipment is one of the preservation positions of a blood analysis equipment storage machine, a control means to start operation conveyed in a blood analysis position is established.

[0087] It faces moving blood analysis equipment to a blood analysis position, and when there is nothing in the position where a movable barrier means closes a penetration hole when starting operation from which the barrier means concerned takes out an extraction means outside, the control means which does not take out an extraction means is established.

[0088] In the blood analysis using a blood analysis equipment holder, an end of extraction of blood or analysis of blood will start operation which collects from a human body extraction means by which the human body was invaded. If the completion of extraction is carried out, in order to return to the pressure of the pressure atmosphere inside a blood collecting cup means and to end invading safely, until the pressure of a blood collecting cup means acquires the signal which returned to atmospheric pressure The control means which does not output the analytical-data output from tools of analysis to a blood analysis equipment holder is established, and the control facility by which the end of blood collecting full fixes a blood collecting means and a blood analysis equipment holder to a human body is prepared.

[0089]

[Effect of the Invention] In the blood analysis equipment by this invention, at the inexpensive price which operates safely by using the apparatus of exclusive use [functions which are needed for blood analysis, such as blood collecting, filtration, and analysis,], and can be dealt with easily also at home, a daily blood test is carried out and it contributes to health care administration and the early detection of

the illness greatly as stated above.

[Brief Description of the Drawings]

[[Drawing 1](#)] The figure explaining conventional blood analysis equipment

[[Drawing 2](#)] The figure explaining the blood cell separation means of conventional blood analysis equipment

[[Drawing 3](#)] The figure explaining the first work example of the blood cell separation means of the blood analysis equipment by this invention

[[Drawing 4](#)] The figure explaining the second work example of the blood cell separation means of the blood analysis equipment by this invention

[[Drawing 5](#)] The figure explaining the third work example of the blood cell separation means of the blood analysis equipment by this invention

[[Drawing 6](#)] The figure explaining the first work example of the blood analysis equipment by this invention

[[Drawing 7](#)] The figure explaining the 1st work example of the blood cell accumulation means of the blood analysis equipment by this invention

[[Drawing 8](#)] The figure explaining the 2nd work example of the blood cell accumulation means of the blood analysis equipment by this invention

[[Drawing 9](#)] The figure explaining the 3rd work example of the blood cell accumulation means of the blood analysis equipment by this invention

[[Drawing 10](#)] The figure explaining the 2nd work example of the blood analysis equipment by this invention

[[Drawing 11](#)] Blood analysis equipment outline 1 (front)

[[Drawing 12](#)] Blood analysis equipment outline 1 (side)

[[Drawing 13](#)] Blood analysis equipment outline 1 (section)

[[Drawing 14](#)] Structure of the blood analysis equipment storage machine 1 (front)

[[Drawing 15](#)] Structure of the blood analysis equipment storage machine 1 (side)

[[Drawing 16](#)] Storage structure of the blood analysis equipment storage machine 1 (section)

[[Drawing 17](#)] Storage structure of the blood analysis equipment storage machine 1 (front)

[[Drawing 18](#)] Blood collecting structure of the blood analysis equipment storage machine 1 (front)

[[Drawing 19](#)] Storage structure of the blood analysis equipment storage machine 2 (section)

[[Drawing 20](#)] Blood analysis equipment outline 3 (front)

[[Drawing 21](#)] Blood analysis equipment outline 3 (side)

[[Drawing 22](#)] Blood analysis equipment outline 3 (section)

[[Drawing 23](#)] Blood analysis equipment 2 outline

[[Drawing 24](#)] Storage structure of the blood analysis equipment storage machine 2 (front)

[[Drawing 25](#)] Blood collecting structure of the blood analysis equipment storage machine 2 (front)

[[Drawing 26](#)] Blood collecting structure of the blood analysis equipment storage machine 2 (section)

[[Drawing 27](#)] Blood analysis equipment outline 3 (front)

- [Drawing 28] Blood analysis equipment outline 3 (side)
[Drawing 29] Blood analysis equipment outline 3 (section)
[Drawing 30] Blood analysis equipment 3 outline (front)
[Drawing 31] Storage structure of the blood analysis equipment storage machine 3
[Drawing 32] Blood collecting structure of the blood analysis equipment storage machine 3
[Drawing 33] Blood analysis equipment
[Drawing 34] Blood analysis equipment holder explanatory view
[Drawing 35] Blood analysis equipment holder extraction means explanatory view
[Drawing 36] Blood analysis equipment holder operation explanatory view
[Drawing 37] Blood analysis equipment storage machine extraction means exhausting section
explanatory view
[Drawing 38] Blood analysis equipment storage machine recovery mechanism explanatory view
[Drawing 39] Blood analysis equipment extraction means recovery mechanism explanatory view
[Drawing 40] Blood analysis equipment extraction means recovery explanatory view
[Explanations of letters or numerals]
101 Support Board,
102 Extraction Means,
103 Separation Means,
104 Tools of Analysis,
105 A Channel Means to Connect Tools of Analysis and Transportation Device,
106 Transportation Device,
107 A Channel Means to Connect Transportation Device and Waste Fluid Means,
108 Waste Fluid Means
109 The Conventional Filtration Means
110: Channel means
111: The 1st blood cell filtration means
112: The first blood cell
113: The 2nd blood cell filtration means
114: The 2nd blood cell
115: The 3rd blood cell filtration means
116: The 3rd blood cell
117: The blood channel means after blood cell separation
118: The first blood cell accumulation means
119: The 2nd blood cell accumulation means
120: The 3rd blood cell accumulation means
121: The 1st blood cell channel means
122: The 2nd blood cell channel means
123: The 3rd blood cell channel means
124: The blood inflow direction
125: Blood cell channel means
126: Straight line filtration means
127: Crookedness channel means

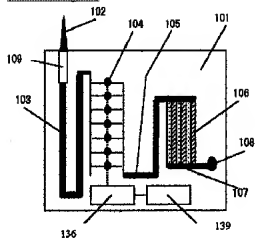
- 128: Crookedness filtration means
- 129: Blood cell separation means
- 130: Blood cell accumulation means
- 131: The 2nd and 3rd blood cell part style means
- 132: The 3rd blood cell part style means
- 133: Plasma part style means
- 134: Living body conformity film formation part
- 135: Living body conformity film agenesis part
- 136: Output means
- 137: A channel means to connect a blood cell accumulation means and a transportation device
- 138: A channel means to connect a blood accumulation means and a waste fluid means,
- 139: Control means,
- 140: The channel which connects a filtration means and tools of analysis,
- 141: Blood extraction perception means
- 201: Protective case,
- 202: Support board,
- 203: Extraction means,
- 204: Blood collecting channel,
- 205: Blood collecting piping,
- 206: Conveyance guide 1,
- 207: Conveyance guide 2,
- 208: Conveyance guide 3,
- 209: Fixed obstacle means 2,
- 210: Waste fluid mouth means,
- 211: Waste fluid mouth closure means,
- 212: Contact part means,
- 213: Blood analysis equipment storage machine,
- 214: Penetration hole means 1,
- 215: Conveyance way means 1,
- 216: Barrier means 1,
- 217: Conveyance means puncturing part,
- 218: Extraction operation means opening 1,
- 219: Extraction operation means opening 2,
- 220: Closure means,
- 221: Preservation position connection means,
- 222: Conveyance means 2,
- 223: Barrier means 2,
- 224: Blood analysis equipment control spring,
- 225: Blood analysis equipment conveyance way change standby part,
- 226: Means of communication,
- 227: Blood analysis equipment storage machine conveyance arm holding part,
- 228: The blood analysis equipment conveyance direction 1,
- 229: The blood analysis equipment conveyance direction 2,

- 230: Movable barrier means,
- 231: Penetration means 2,
- 232: Barrier means conveyance arm puncturing part,
- 233: The barrier means 2 conveyance direction 1,
- 234: The barrier means 2 conveyance direction 2,
- 235: Blood analysis equipment preservation position,
- 236: Analysis position
- 237: Blood analysis equipment rotation center,
- 238: Blood analysis equipment hand of cut,
- 239: Extraction means tip part conveyance course,
- 240: Blood analysis equipment exterior tip part,
- 241: Blood analysis equipment rotation stop position,
- 242: The blood analysis equipment conveyance direction 3,
- 243: Blood analysis equipment rotation support position,
- 244: Terminal area means
- 245: A control means with a data accumulation function
- 301: Blood collecting cup means 1,
- 302: Blood collecting cup means outer wall,
- 303: Invasing depth controller,
- 304: Blood collecting means supporter 1,
- 305: Pressure perception means,
- 306: Blood collecting cup means 2,
- 307: Extraction means maintenance means,
- 308: The blood analysis storage machine fixed to the blood analysis position,
- 309: Decompression pump,
- 310: A control means and a transmitting receiving means,
- 311: Transmission / receiving means,
- 312: Blood analysis equipment holder,
- 313: Channel piping 1,
- 314: Blood analysis equipment storage machine conveyance means 1,
- 315: Transportation device conveyance arm,
- 316: Transportation device,
- 317: Blood analysis storage machine conveyance means 2,
- 318: The blood analysis storage machine conveyance means 2 move direction,
- 319: Proofreading liquid supply arm,
- 320: Proofreading liquid supply arm wheel pin,
- 321: Proofreading liquid charging line,
- 322: Proofreading liquid supply tank,
- 323: Blood analysis storage machine charge guide,
- 324: Intact blood analysis equipment storage machine,
- 325: Blood analysis storage machine cassette,
- 326: Blood analysis storage machine charge spring,
- 327: Intact blood analysis storage machine support plate,

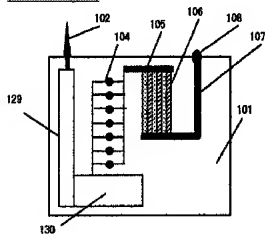
328: Extraction means,
 329: Proofreading liquid supply pump,
 330: Blood collecting means supporter 2,
 331: Blood analysis equipment storage machine conveyance arm,
 332: The transportation device conveyance arm move direction,
 333: Transportation device bonding link,
 334: Blood analysis equipment conveyance way,
 335: Blood analysis equipment lock-pin,
 336: Blood analysis equipment storage machine contact part,
 337: Blood analysis equipment conveyance arm 1,
 338: Blood analysis equipment conveyance arm lock-pin,
 339: Blood analysis equipment storage machine conveyance way guide,
 340: Blood analysis equipment fixed arm,
 341: Blood analysis equipment conveyance arm 2,
 342: Blood analysis equipment conveyance pin,
 343: The blood analysis equipment storage machine move direction,
 344: The blood analysis equipment conveyance pin move direction,
 345: Blood analysis equipment conveyance pin insertion opening,
 346: The blood analysis equipment move direction 1,
 347: The blood analysis equipment move direction 2,
 348: Blood analysis equipment conveyance way,
 349: Extraction means recovery means,
 350: Input-and-output means,
 351: Blood analysis equipment conveyance pin introduction hole 2,
 352: Blood analysis equipment conveyance pin,
 353: The blood analysis equipment conveyance arm move direction 2,
 354: Blood analysis equipment conveyance pin introduction hole 3,
 355: Blood analysis equipment conveyance pin aggressiveness raising lever,
 356: The blood analysis equipment conveyance pin move direction,
 357: Transportation device bonding link,
 358: Blood collecting cup contact part,
 359: Extraction means central part,
 360: Blood collecting cup contact part 1,
 361: Blood collecting cup contact part 2,
 362: Extraction means tip part,
 363: Decompression opening piping,
 364: Decompression pump piping,
 365: Blood collecting cup deepest part,
 366: Decompression pump,
 367: Decompression shield,
 368: Control means,
 369: Blood analysis equipment holder exterior,
 370: Extraction means recovery mechanism point of contact,

- 371: Rotation support position,
 372: Extraction means recovery arm,
 373: Extraction means recovery point of contact,
 374: The collected blood collecting means

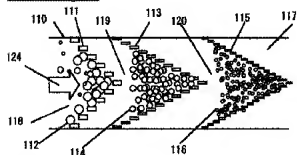
[Drawing 1]



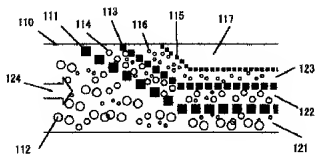
[Drawing 2]



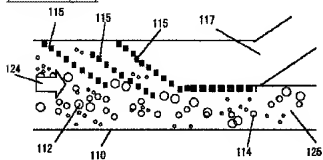
[Drawing 3]



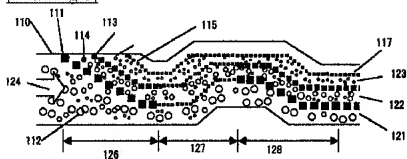
[Drawing 4]



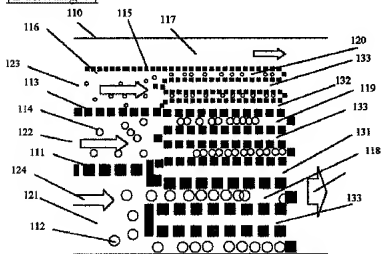
[Drawing 5]



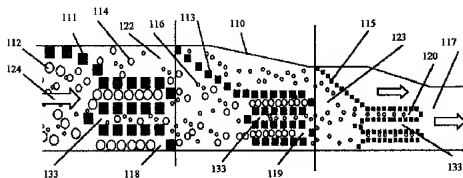
[Drawing 6]



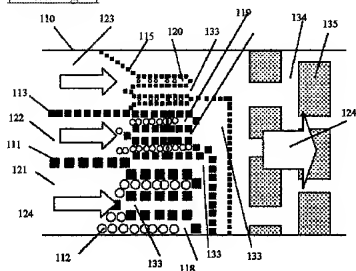
[Drawing 7]



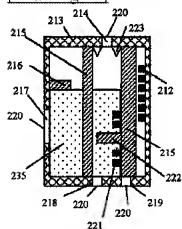
[Drawing 8]



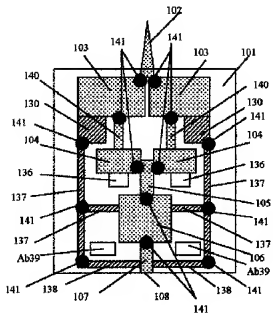
[Drawing 9]



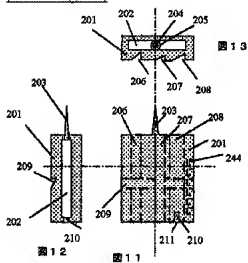
[Drawing 14]



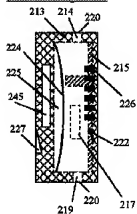
[Drawing 10]



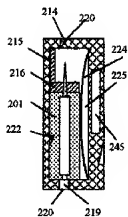
[Drawing 11]



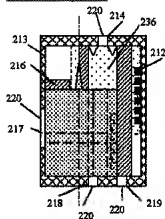
[Drawing 15]



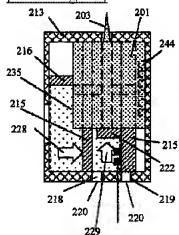
[Drawing 16]



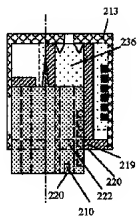
[Drawing 17]



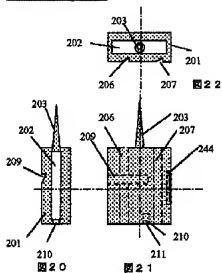
[Drawing 18]



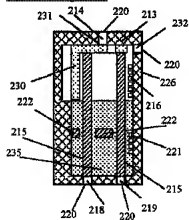
[Drawing 19]



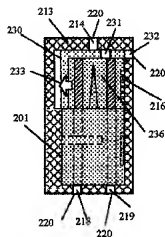
[Drawing 20]



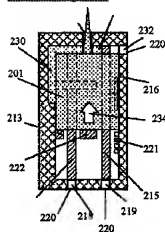
[Drawing 23]



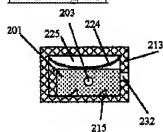
[Drawing 24]



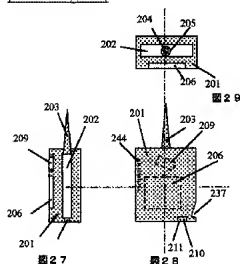
[Drawing 25]



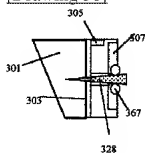
[Drawing 26]



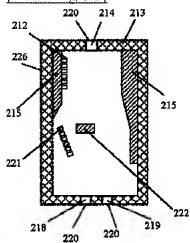
[Drawing 27]



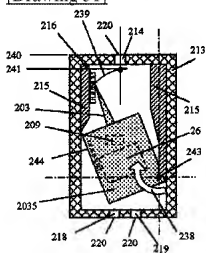
[Drawing 36]



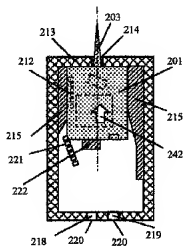
[Drawing 30]



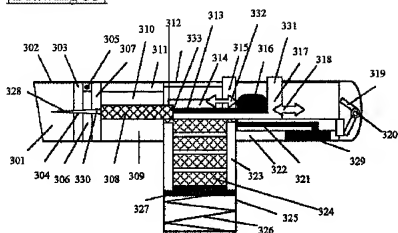
[Drawing 31]



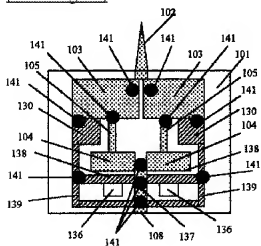
[Drawing 32]



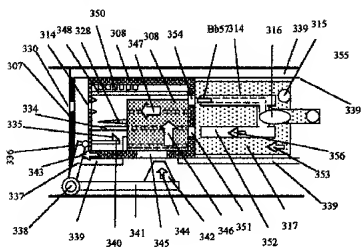
[Drawing 33]



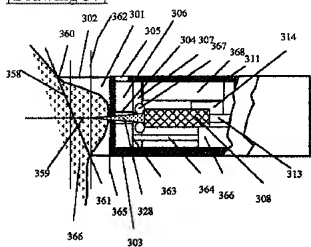
[Drawing 34]



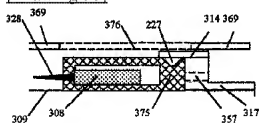
[Drawing 35]



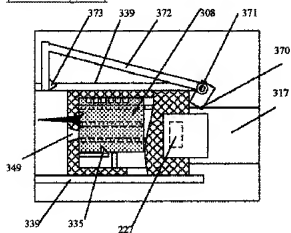
[Drawing 37]



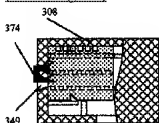
[Drawing 38]



[Drawing 39]



[Drawing 40]



[A Written Amendment]

[Filing Date] Heisei 14(2002) January 3 (2002. 1.3)

[Amendment 1]

[Document to be Amended] Description

[Item(s) to be Amended] DETAILED DESCRIPTION

[Method of Amendment] Change

[Proposed Amendment]

[Detailed Description of the Invention]

[0001]

[Field of the Invention] The analysis equipment and the production method of the blood using the chip equipment currently called the micro capillary constituted by the micro slot channel which produced this invention to insulation material boards, such as a quartz board and a polymer board, It is a field about the composition and the controlling method of a package and a special-purpose machine machine which are needed when using the blood analysis equipment concerned.

[0002]

[Description of the Prior Art] [the blood extracted by the extraction means 102 of blood established on the support board 101] as conventional blood analysis equipment is shown in drawing 1 After a conventional filtration means 109 to filter plasma separates in advance of analysis of blood, it introduces and accumulates into a separation means 103 by which the curvilinear form part of the U character pipe is prepared, and 2nd separation of serum and a blood cell is performed inside a separation means with a centrifuge separation method. The method of choosing either and separating only by one side is sufficient as this these these filtration means and a separation means. Analysis of blood is faced following the end of separation operation. By driving the pump which is the transportation device 106 which carries out blood movement It analyzes by introducing the serum accumulated into the separation means in the tools of analysis 104 by discharging the buffer solution accumulated into the pump which are the channel means 105 and the transportation device 106, and the channel means 107 from the discharge means 108 to the chip exterior. It obtains and excels by this analysis, and blood analytical data are outputted outside and end blood analysis.

[0003] Therefore, the method of the composition of blood analysis equipment constituting a control means 139 to control a series of operation of this these these means, and an output means 136 to output an analysis result outside, on one or two or more support bases in addition to this these the aforementioned this means, and analyzing blood was needed.

[0004] Moreover, the blood which the blood analysis equipment concerned extracted is set for a

filtration means to perform separation of a blood cell and plasma. In order to filter gradually from a large blood cell to a small blood cell like the old work example shown in [drawing 2](#) according to the size of a blood cell Along the inflow direction 124 of the channel 110 of blood, establish the first filtration means 111, and accumulate a blood cell 112 in the first blood cell accumulation means 118, and it is removed. Next, the method of removing by establishing the second filtration means 113, accumulating a blood cell 114 in the second blood cell accumulation means 119, removing it, establishing the third filtration means 115 finally, and accumulating a blood cell 116 in the third blood cell accumulation means 120, and completing filtration operation was used. The number of stages of these filtration means can be changed according to the filtration characteristic for which it asks.

[0005] Moreover, when using the blood analysis equipment concerned, the method of doing the opening work of closure of the blood analysis equipment by manual operation and the storage work by manual operation after use at the time of use was taken.

[0006] Furthermore, when using the blood analysis equipment concerned, the method of performing output control by manual operation was used also in control of the invading depth of the extraction means concerned, or blood collecting time, and the output of blood analytical data in blood collecting operation.

[0007]

[Problem to be solved by the invention] However, the thing which complication and large-scale-izing of the system of analysis equipment produce by the method of constituting all the means required by an output from extraction in one or two or more support bases, joining together as one disposable system, and using blood analysis equipment, Since a control means by which blood is not contacted directly, an output means, etc. become indispensable [throwing away simultaneously], the composition of a system becomes expensive. Therefore, it is necessary to constitute the portion which becomes useless to the minimum.

[0008] In the composition of such blood analysis equipment, in the conventional filtration means, a blood cell is accumulated in the blood cell accumulation means concerned, and we are anxious about the change problem of the constituent-of-blood ratio which the blood cell destruction by the increase in blood collecting time by piping resistance increase of a channel, or pump load increase and the increase in pressure inside a blood cell accumulation means causes. Therefore, in order to solve these problems, the blood analysis equipment using the blood cell filtration means which was simplified and was constituted from a means by which a centrifuge separation method is not necessarily used and which and was simplified needs both composition methods. [blood analysis] Moreover, when using blood analysis equipment, the storage work by manual operation after opening of closure by manual operation or use is eliminated, from opening to storage is performed automatically, and a still safer preservation means is required.

[0009] Furthermore, the control means for performing a series of blood analysis operation to blood collecting operation which performs a blood collecting means safely, accumulation of analytical data, and storage of the blood analysis equipment after transmission and the end of blood analysis when using actual blood analysis equipment is required.

[0010]

[Means for solving problem] This invention offers inexpensive and safe blood analysis equipment, having the same function and performance by constituting each as individual equipment or apparatus and joining together combining these on the occasion of blood analysis, in order to solve these technical

problems. Two or more means to contact directly the blood extracted from a human body are constituted from simplification of blood analysis equipment as one piece of equipment, and it is considered as throwing away, and by constituting two or more means by which it does not contact blood and directly, as another equipment, and using them by one side, repeatedly, it is inexpensive and simplification and a safe equipment configuration are offered. The outline of the blood analysis equipment which simplified the blood cell filtering method to drawing 6 is shown. With the blood analysis equipment concerned, the blood attracted by the suction pump 106 is introduced into the inside of blood analysis equipment through the extraction means 102, and the extracted blood passes the filtration means 129 and the blood cell accumulation means 130, and has composition of a simple means to carry out movement to the tools of analysis 104 of plasma immediately.

[0011] Moreover, when using blood analysis equipment, the storage work by manual operation after opening of closure by manual operation or use is eliminated. The blood analysis equipment storage machine which has secured the safe preservation means is formed, a control means of operation, and the connection means and means of communication of analytical data required for an output are formed in this, and further used blood collecting means are collected safely.

[0012] Furthermore, when using actual blood analysis equipment, the blood analysis equipment holder which controls even storage of the blood analysis equipment after blood collecting operation, accumulation and transmission of analytical data, and the end of blood analysis, and performs it is prepared, and the apparatus which carries out motion control of these continuously, and conducts blood analysis is offered.

[0013]

[Mode for carrying out the invention] The first work example

The outline of the composition of the filtration means based on this invention used for the blood analysis equipment concerned shown in drawing 6 was shown in drawing 3. All over the figure after this figure, the same number describes the same thing as what was shown before this figure. By the pattern group of the 1st blood cell filtration means 111 prepared in the inside of a channel 110, the blood 124 introduced from the extraction means introduces the 1st blood cell 112 to the 1st blood cell channel means 121. Then, the blood containing the 2nd blood cell 114 and 3rd blood cell 116 which passed the 1st blood cell filtration means introduces the 2nd blood cell to the 2nd blood cell channel means 122 by the pattern group of the 2nd blood cell filtration means 113. furthermore -- then, the blood which consisted of the 3rd blood cell and plasma -- the -- the 3rd blood cell is introduced to that of the 3rd blood cell channel means 123 by the blood cell filtration means 115 of eye three, and the remaining blood separated with the filtration means is moved by a channel 117.

[0014] The blood cell and size which prevent passage are gradually made small from the large size in an order from the upper stream of a channel, and the pattern group prepared into the channel forms the channel of blood in the above mentioned appearance, and makes it move to it combining the pattern group to which separate into for every size of a blood cell, and it is made to move. Moreover, although the stage of the filtration means showed what was constituted from a three-stage in the work example, it is possible to make into further two or more stages the particles in the blood which should be filtered, and to have composition.

[0015] The second work example

The composition outline of the 2nd work example of the filtration means based on this invention is shown in drawing 4. In this work example, in order to separate the blood cell more than a desired size

collectively and to divide the blood cell of the size more than a request, and the blood cell below a request into a different channel, the desired minimum size has used for the filtration means the pattern group used for the filtration means 115 as the 3rd blood cell used for said first work example, for example.

[0016] As for the blood 124 introduced from the extraction means, the pattern group of a blood cell filtration means 115 of a channel 110 to filter the blood cells from the 1st to the 3rd collectively in part is prepared. The blood which passes a channel bundles up a big blood cell, is separated from the size defined by this pattern group, the blood cell channel means 125 is moved, and the blood containing the blood cell of a size smaller than the 3rd blood cell moves the blood channel means 117 after blood cell filtration. Moreover, as shown in this figure, it is possible for there to be no necessity that the channel of a blood cell and plasma is single, to separate a channel after filtration, and to move blood to tools of analysis efficiently.

[0017] Moreover, it faces arranging these filtration means inside a channel, the pattern group of the same filtration means is made multiplex in two or more steps, and it prepares in piles in a channel, it arranges so that two or more filtration can be performed, and the performance of filtration is raised.

[0018] The third work example

The composition outline of the 3rd work example of the filtration means based on this invention is shown in drawing 5. As for the blood which flowed into the filtration means from the direction shown by 124, although separation is recommended for every size of the 1st, the 2nd, and the 3rd blood cell, a small blood cell tends to be mixed in the channel of a big blood cell by the field of the straight line filtration means 126 of the first phase. In order to recommend the separation for every desired size further, after, constituting the channel which separated the field of the crookedness channel means 127 only with the 3rd blood cell filtration means for example, and moving, By preparing the channel by the filtration pattern group of an each the size of the blood cell concerned in the field of the crookedness filtration means 128, the blood cell of a small size is returned and moved to the separated original channel by centrifugal separation operation.

[0019] When the arrangement of the filtration pattern group in a main stream way prepared the filtration pattern group which becomes small gradually toward an outside from the inner side of crookedness of the size of the particles which prevent passage and a blood cell moves toward the outside of crookedness by centrifugal separation operation In order that blood cells smaller than the size defined by the filtration pattern group may gather in the crookedness exterior, the separation for every blood cell size is promoted.

[0020] The fourth work example

The composition outline of the 1st work example of the blood cell accumulation means based on this invention is shown in drawing 7. By a blood cell filtration pattern group, the 1st blood cell channel means, the 2nd blood cell channel means, The blood which is divided into the 3rd blood cell channel means 123 and the plasma channel means 117 of plasma, and moves is prepared in the 1st blood cell accumulation means 118, the 2nd blood cell accumulation means 119, and the 3rd blood cell accumulation means 120, and an accumulation means to separate and accumulate every 1st blood cell, 2nd blood cell, and 3rd blood cell is established. the size of the blood cell separated although this example has shown separation of the blood cell as a three-stage -- not a three-stage but further two or more stages -- or it cannot be set as still fewer stages also until it says

[0021] And a blood cell accumulation means and the blood channel means after blood cell filtration are

arranged in parallel with the move direction of blood, and have the structure where the piping resistance by a blood cell being accumulated in a filtration means does not increase remarkably during operation of filtration.

[0022] With each blood cell accumulation means, the 1st blood cell accumulation means The pattern group of the 1st filtration means, The pattern group of the 2nd filtration means and the 3rd blood cell accumulation means are constituted using the pattern group of the 3rd filtration means, the 2nd blood cell accumulation means is established, and a blood cell accumulation means to accumulate a blood cell for every size of a blood cell is established.

[0023] Furthermore, it sets to arrangement of each blood cell accumulation means. Between the 1st blood cell accumulation means, between the 2nd blood cell accumulation means, between the 3rd blood cell accumulation means, The plasma part style means 133 used as the channel of plasma is established between the 1st and 2nd blood cell accumulation means and between the 2nd and the 3rd blood cell accumulation means concerned, and piping resistance by a blood cell being accumulated in the pattern group of a blood cell accumulation means is made into the structure which does not increase during operation of filtration. the size of the blood cell separated although this example has shown separation of the blood cell as a three-stage -- not a three-stage but further two or more stages -- or it cannot be set as still fewer stages also until it says

[0024] The fifth work example

The arrangement style outline of the blood cell accumulation means based on this invention is shown in drawing 8 . In the arrangement which establishes a blood cell accumulation means using two or more filtration pattern groups The 1st accumulation means according from the upper stream to the 1st blood cell filtration means one by one along with a channel, Change a filtration pattern group that the size of the blood cell accumulated gradually seems to become small in order of the 2nd accumulation means by the 2nd blood cell filtration means, and the 3rd accumulation means by the 3rd blood cell filtration means, and two or more blood cell accumulation means are arranged. A blood cell accumulation means to separate and accumulate for every blood cell size by arranging so that the particle diameter accumulated may become small gradually along with a channel has been arranged. Moreover, there is no necessity that the width of a channel including a blood cell accumulation means is constant, and reduction of the blood volume extracted because the increase in the piping resistance by accumulation of a blood cell sets it as the size which does not have influence in movement of blood, and collection time can be aimed at.

[0025] The sixth work example

The outline of the filtration means based on this invention is shown in drawing 9 . The living body conformity film formation part 134 which it faced establishing a blood cell accumulation means using two or more filtration pattern groups, and was covered with the living body conformity film, The channel part 142 which arranged alternately the living body conformity film agenesis part 135 which has not been covered with a living body conformity film, or the channel part 143 which has not been covered with a living body conformity film is formed, and the structure which the blood cell ingredient which remains in the blood after blood cell separation accumulation is made to stick to the living body conformity film surface, and raises separation of a blood cell is established. the size of the blood cell separated although this example has shown separation of the blood cell as a three-stage -- not a three-stage but further two or more stages -- or it cannot be set as still fewer stages also until it says Moreover, it cannot be overemphasized that it is also possible to prepare without combining with a filtration means

to filter a blood cell.

[0026] The composition outline of the channel means based on this invention is shown in drawing 10. However, it is not necessary to be blood analysis equipment which not necessarily contained the transportation device and the control means in the actually used blood analysis equipment. The blood which filtered the blood cell of the size more than the request which moved from a filtration means means 115 to filter the blood cell of a desired size from blood in drawing 5 leads to the tools of analysis 104 shown in drawing 10 from the channel 117. It has channel composition which minimizes mixing of the blood cell included in tools of analysis and in which blood analysis operation is made in the inside of a short time.